

THE STRIKE FORCE LEADER: JACK OF ALL TRADES, MASTER OF ALL TRADES

**A MONOGRAPH
BY
Major Chester F. Dymek III
Armor**



**School of Advanced Military Studies
United States Army Command and General Staff
College
Fort Leavenworth, Kansas**

Second Term AY 98-99

Approved for Public Release Distribution is Unlimited

DTIC QUALITY INSPECTED 4

19991109 040

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)

2. REPORT DATE
27 May 1999

3. REPORT TYPE AND DATES COVERED
SAMS MONOGRAPH

4. TITLE AND SUBTITLE
THE STRIKE FORCE LEADER: JACK OF ALL
TRADES, MASTER OF ALL TRADES

5. FUNDING NUMBERS

6. AUTHOR(S)
CHESTER F. DYMEK, III

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Command and General Staff College
School of Advanced Military Studies
Fort Leavenworth, Kansas 66027

8. PERFORMING ORGANIZATION
REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)
Command and General Staff College
School of Advanced Military Studies
Fort Leavenworth, Kansas 66027

10. SPONSORING / MONITORING
AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION / AVAILABILITY STATEMENT
APPROVED FOR PUBLIC RELEASE:
DISTRIBUTION UNLIMITED.

12b. DISTRIBUTION CODE

13. ABSTRACT (Maximum 200 words)

ENCLOSED

14. SUBJECT TERMS
STRIKE FORCE, LEADERSHIP, CRITICAL THINKING,
LEADER DEVELOPMENT, EDUCATION

15. NUMBER OF PAGES
104

16. PRICE CODE

17. SECURITY CLASSIFICATION
OF REPORT
UNCLASSIFIED

18. SECURITY CLASSIFICATION OF THIS
PAGE
UNCLASSIFIED

19. SECURITY CLASSIFICATION
OF ABSTRACT
UNCLASSIFIED

20. LIMITATION OF ABSTRACT
UNLIMITED

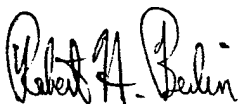
SCHOOL OF ADVANCED MILITARY STUDIES


MONOGRAPH APPROVAL


Major Chester F. Dymek III

Title of Monograph: *The Strike Force Leader: Jack of All Trades, Master of All Trades*

Approved by:


for COL William R. Puttmann, MMAS Monograph Director


LTC Robin P. Swan, MMAS Director, School of Advanced Military Studies


Philip J. Brookes, Ph.D. Director, Graduate Degree Program

Accepted this 27th Day of May 1999

ABSTRACT

The United States Army's concept to best leverage new technologies and support expanding mission requirements in the twenty-first century is to field a "Strike Force." The initial Strike Force will serve as an interim headquarters, able to rapidly deploy anywhere on the globe with subordinate elements selected and tailored to meet specific mission requirements. The Strike Force will later serve as the technological bridge between the light and mechanized forces into the Army After Next. This monograph answers the question: "Can the United States Army integrate critical and adaptive thinking strategies to develop the adaptive leaders required for the Strike Force?"

A central point to the argument of critical and adaptive thinking strategies is an understanding of decision making skills. The overall intent is to specifically address expert decision-making strategies in complex, uncertain environments because all military decisions are made in the realm of the uncertain. As noted by our senior leadership, the twenty-first century spectrum of conflict or action will be inherently ill-defined, not because of poor guidance or instruction, but because of the complexity of the problems.

America's Army will possess creative and adaptive leaders in both the Strike Force of Force XXI and the Army After Next, just as it has for the past two centuries. However, it may appear that the U.S. military remains institutionally trapped in an industrial age paradigm in terms of decision making as well as leader selection over development. This factor is a significant barrier to complete integration of critical thinking strategies required to develop Strike Force leaders.

This monograph recommends a new way of conceptualizing the battlefield, a different approach of instructing in the school houses, and a fundamental change in the process of developing subordinate leadership skills. The challenge is to develop a new mindset to fully harness the technological advantages of the information age. The cognitive developmental emphasis for training and education should be on critical, reasoned thought and the mechanisms to assess it. Additionally, given an overall reduction in military forces and a subsequent increased reliance on reserve forces, the emphasis in the leader lifecycle should shift to a rapid, cognitive maturation process over a hierarchical promotion-based selection process for the Total Force.

TABLE OF CONTENTS

List of Abbreviations	v
I. Introduction	1
Problem Statement and Research Question	3
What is the purpose of a Strike Force?	4
US Army Doctrine and Concepts	6
Assumptions	9
Methodology	12
II. Why must a Strike Force leader be different?	14
How will a Strike Force function?	14
What are the leadership implications of a Strike Force?	16
III. What are the leadership skills, attributes and behaviors expected of the Strike Force leader?	17
Differentiate between leadership and requirements for a leader	17
Identifying the skills, attributes, and behaviors	20
Skills	21
Military Decision-Making	23
Adaptability	26
Critical and Creative Thinking	26
IV. How do you identify, select, and develop a Strike Force leader?	28
Expert Decision-Making	28
Identification, Selection and Development	33
Education	35
Training	39
Assessment Mechanisms	40
V. Conclusions and Recommendations	42
Endnotes	48
Annex A Glossary	62
Annex B Leadership	71
Annex C Knowledge, Skills, Attributes, and Personality Constructs	76
Annex D Leader Dimensions	78
Annex E Assessment Mechanisms	81
Selected Bibliography	83

LIST OF ABBREVIATIONS

AAN	Army After Next
ABCS	Army Battle Command System
AOE	Army of Excellence
ASAS	All Source Analysis System
AWE	Advanced Warfighting Experiment
BCTP	Battle Command Training Program
C2	Command and Control
C3	Command, Control, and Communications
C4	Command, Control, Communication, and Computers
C4I	Command, Control, Communication, Computers, and Intelligence
C4I2	Command, Control, Communication, Computers, Intelligence, and Interoperability
C4ISR	Command, Control, Communication, Computers, Intelligence, Surveillance and Reconnaissance
CCIR	Commander's Critical Information Requirements
CDMP	Combat Decision Making Process
CGSC	Command and General Staff College
CGSOC	Command and General Staff Officers Course
COE	Common Operating Environment
CTC	Combat Training Center
DAWE	Division Advanced Warfighting Experiment
FBCB2	Force XXI Battle Command Brigade and Battalion
FM	Field Manual
J-STARS	Joint Surveillance Target Attack Radar System
MCS	Maneuver Control System
MDMP	Military Decision Making Process
MIT	Massachusetts Institute of Technology
NTC	National Training Center
RCP	Relevant Common Picture
RMA	Revolution in Military Affairs
RSTA	Reconnaissance, Surveillance, Target Acquisition
TDMP	Tactical Decision Making Process
TFAWE	Task Force Advanced Warfighting Experiment
TRADOC	Training and Doctrine Command
UAV	Tactical Unmanned Aerial Vehicle
USCGSC	United States Army Command and General Staff College

Chapter I. Introduction

The United States Army is changing from a forward deployed, industrial age force, designed to stop the Soviet Red Army's westward attack through northern and central Europe, to a power projection information age army. Although future focused with the Advanced Warfighting Experiment (AWE),¹ Force XXI Initiatives,² and the Army After Next (AAN),³ today's Army still must maintain its readiness to defeat a conventional, adaptive, thinking, industrial era foe. The Army's concept to best leverage new technologies and support expanding mission requirements in the twenty-first century is to field a "Strike Force." The initial Strike Force will serve as an interim headquarters, able to rapidly deploy anywhere on the globe with subordinate elements selected and tailored to meet specific mission requirements. The Strike Force will later serve as the technological bridge between the light and mechanized forces into the Army After Next.

However, as we approach the dawn of the twenty-first century, the lines of time between the current force structure and the future concepts of Force XXI and the Army After Next vanish rapidly. During this transitional state, one may expect that the Army "will remain fully engaged throughout the world, meeting the nation's security needs and helping shape the future strategic environment."⁴ Our military leadership looks toward technological advances to enhance mobility, survivability and lethality, in order to identify, engage and destroy hostile forces successfully in an unstable, uncertain world for both the near and far term. The Strike Force offers the Army's leadership a cost and time effective option to test and validate future concepts while still providing the National Command Authority viable deterrent and response options.

The Strike Force interim headquarters will integrate the attached forces and conduct offensive, defensive, stability, or support operations. The primary functions of the Strike Force will be early entry, peace keeping, and deterring or containing a crisis, but it may also perform humanitarian assistance and high-end decisive operations. The future Strike Force, originally a product of the Army After Next study, is envisioned to be a rapidly deployable, combined arms force capable of responding decisively to a crisis anywhere on the globe. The Strike Force of the Army After Next would fulfill the requirement for a medium-weight, technologically superior force capable of sustaining operations in a wide range of environments against an equally diverse opposing force.⁵

However, technology alone has never been and still is no substitute for effective leadership, strategy, or tactical execution. Technology has not and most likely will not sanitize warfare through automated decision making, precision-guided munitions, or satellite-video command and control. Although the Strike Force leader must account for information age technologies changing the military to a knowledge-based force within a framework of function and time, leadership in the Strike Force remains soldier focused. One should not forget or minimize the importance that in the end, human beings fight the battles, keep the peace, and provide the support.⁶ Given a future organization, mission, and environment that is extremely complex and diverse, the Strike Force leader may be expected to exercise both direct and organizational leadership over subordinates. Additionally, the Strike Force leader may require critical thinking characteristics different than those exhibited by today's leaders.⁷ Therefore, the focus of this monograph is on defining and developing the requisite skills, knowledge, and attributes of twenty-first century leaders of character and competence.

Problem Statement and Research Question. The Constitution of the United States provides that Congress shall have the power to “raise and support Armies” and to “provide for the common defense.”⁸ Under Title 10, United States Code, “the Army provides the unified or joint force commander the capacity for land force dominance... (and the ability to) compel lasting change.”⁹ To achieve this dominance, the Total Army contributes land forces and capabilities to protect, support, and promote the global interests of the United States. America will continue to engage her military as the United States pursues international security, promotes democracy, protects human rights, and works to establish free market economies. Our challenge is to transition to a capabilities based force that provides the strategic decision makers with a wide range of options for both home and abroad in unilateral, joint, or multi-national operations.¹⁰

As a possible answer to the dynamic and complex current and future environments, our leadership is developing a Strike Force that would initially complement current battle forces and strongly augment the Army’s early entry capability. Beginning with an interim Strike Force headquarters, the Army would then develop and employ future technologies, reorganize forces, and field a complete Strike Force as part of the Army After Next. The Army’s long-term vision for the Strike Force is to provide the National Command Authority a rapidly deployable force capable of conducting offensive, defensive, stability, and support operations. The primary research question of this monograph is can the United States Army integrate critical thinking strategies to develop the leaders required for the Strike Force? The subordinate questions that follow are what is a Strike Force, what are the requisite skills, knowledge, abilities, and critical

thinking strategies of a Strike Force leader, and how does one develop a Strike Force leader?

Force XXI Operations is centered around quality soldiers and leaders whose full potential is...realized through information age technologies and by rigorous and relevant training and leader development.... It describes an operational environment where the acquisition, processing, and rapid sharing of information revolutionizes the conduct and tempo of operations.... To win on future battlefields, future leaders...must be skilled in the art of military operations, [and] capable of adjusting rapidly to the temporal and spatial variations of new battlefields.¹¹

What is the purpose of a Strike Force? In developing the concepts of Force XXI operations, America's military leadership faced the problem that the United States does not have a solitary, peer competitor the post Cold War era. The quote above indicates that Force XXI will be a capabilities-based military force that relies on highly trained soldiers and leaders who employ sophisticated technology. America's Army is the world's premier ground combat force, trained, equipped and ready to defeat any conventional foe. As the military remains poised to meet the challenges of the last eight months of the twentieth-century, the Army is also adapting to meet the challenges of the Information Age as Force XXI. "Strike Force is the Army's concept to fill a recognized need for adaptable capabilities to the Commanders-in-Chiefs (CINCs) and the National Command Authorities in support of the National Security Strategy."¹² General Reimer said that Strike Force experimentation has three objectives:

- To develop and field an adaptable, rapidly deployable force to meet warfighting commanders' in chief needs.
- To act as a leader development laboratory. General Reimer said the Joint Readiness Training Center at Fort Polk, Louisiana, is an "ideal place" to explore ideas with the Strike Force that can be integrated throughout the Army.
- To be a prototype for Army After Next organizations.¹³

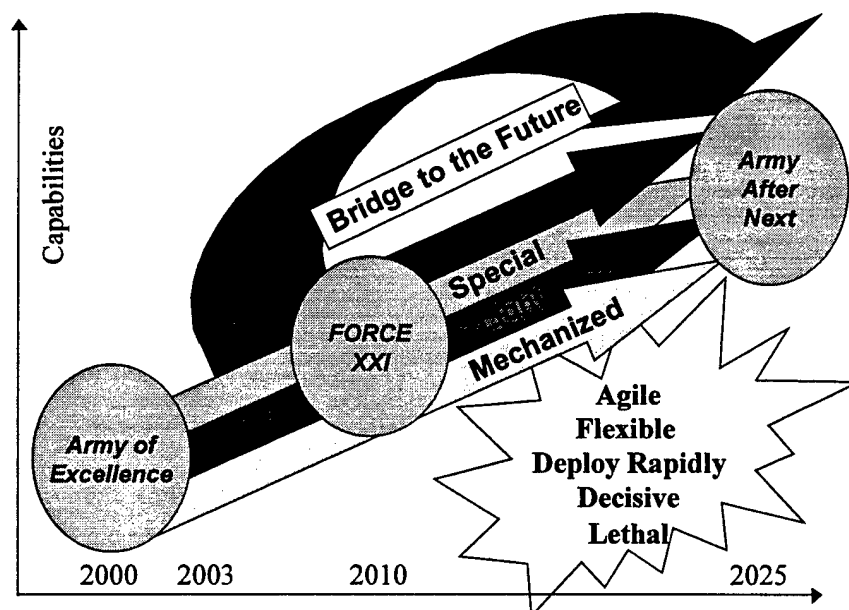
Discussion in military affairs [of the **2010-2025** timeframe] has centered around the impact of technology on weapon systems, but a more profound level of efficiency will derive from new organizational structures and training strategies that promise to leverage and capitalize the most from new technologies.

-- *Army After Next Project, First Annual Report, June 1996*

AAN research indicates that while the current multi-polar international security system will remain largely intact, tomorrow's world will become increasingly complex, characterized by shifting balances within regions and the prevalence of ad-hoc security structures, vice stable alliances.

-- *Army Strategic Planning Guidance, December 1998*

Contrasting the two paragraphs from the openings of the respective reports, the current trend is not to focus on the capabilities of technology, but to defining what these advantages will actually leverage. The Strike Force of the Army After Next will be an adaptable force with multiple functions. Graphically portrayed below, the Strike Force will serve as the technological bridge to the Army of the future.



The Strike Force headquarters will possess "a world-class command and control

capability upon which we can hang conventional capabilities that exist in our other forces to be the point of the spear.”¹⁴ With enhanced command and control functions, a major distinguishing feature of a Strike Force is the ability to expand or contract – to match the organization to the specific mission requirements. This would allow the United States to maximize capabilities of our limited resources by tailoring the force.

U.S. Army Doctrine and Concepts. Through the nineteenth century there does not appear much debate on why some people were effective military or political leaders. Men were born leaders through royal birth or destiny. Until the past 75 years, the science of leadership was limited to historical study that generated lists of dominant personal characteristics, skills, and abilities. From these traits one could identify and either select or train future leaders.¹⁵ Following World War II and recognizing the leadership shortcomings and failures within the American Armed Forces, General Dwight D. Eisenhower, as Army Chief of Staff, directed then U.S. Military Academy Superintendent General Maxwell D. Taylor, to institute a leadership development curriculum and program. The 1999 draft edition of Field Manual 22-100, *Army Leadership*, reflects fifty years of disciplined scientific study and targets all Army leaders. The manual defines leadership as “**influencing** people – by purpose, direction and motivation – while **operating** to accomplish the mission and **improving** the organization.”¹⁶ As opposed to focusing on individual traits or characteristics, *Army Leadership* highlights the three primary functions or actions of a leader; influencing others, accomplishing a goal, and developing the members and the organization.

Although an individual may be a highly effective or efficient leader in the context

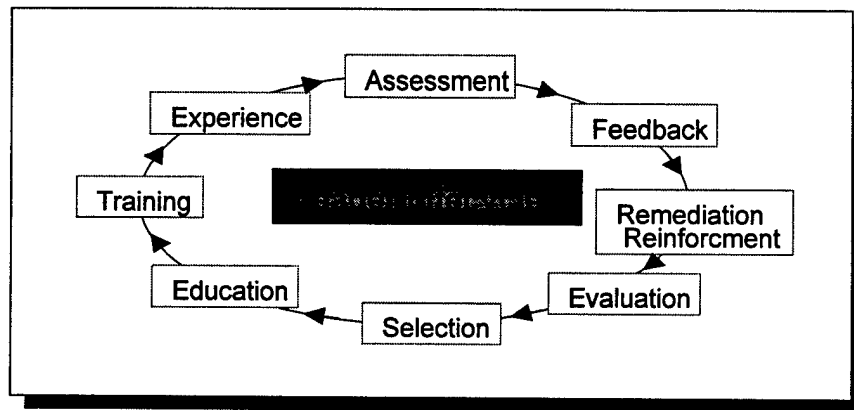
described above, America's military expects more from leaders than merely exercising leadership. A leader must have character, knowledge, and the ability to act in order to achieve excellence through developing a force that can fight and win the nation's wars and serve the common defense of the United States. "Be, Know, Do" still is the most concise and clear statement of the essential leadership principles. In simplest terms, character and competence equate to the "Be" and "Know" and underline all leader actions. General Dennis Reimer, Army Chief of Staff, aptly stated that we are a values based Army, and values are the basis for a leader of character.¹⁷ Influencing, operating, and improving are the leader actions, and may be characterized as the "Do." The model depicting the relationship of the leader dimensions and principles is below.¹⁸

The Core Leadership Dimensions and The Army Leadership Framework

<i>The Leader of Character and Competence</i>			<i>Acts to achieve Excellence by providing purpose, direction, and motivation.</i>		
VALUES	ATTRIBUTES	SKILLS	ACTIONS		
"Be"	"Be"	"Know"	"Do"		
Honor	Mental	Interpersonal	Influencing	Operating	Improving
Integrity			Communicating	Planning	Developing
Courage	Physical	Conceptual			
Loyalty			Decision-making	Executing	Building
Selfless service	Emotional	Technical			
Respect			Motivating	Assessing	Learning
Duty		Tactical			

Army Regulation 600-100, *Army Leadership*, defines leader development as, "the

structured career long process of preparing leaders in the Total Army to succeed in leadership positions of increased responsibility. It applies to both military and civilian personnel. Leader development is accomplished through an integrated, progressive and sequential system of institutional training and education, operational assignments, and self-development.”¹⁹ A model for the army leader lifecycle is below. Of particular note is that although the beginning point is selection, also critical to leader development are education, training, and experience throughout an individual’s service to the nation.



Department of the Army Pamphlet 600-3, *Commissioned Officer Professional Development and Utilization*, describes professional development as being, “accomplished through planned schooling and progressive assignments.”²⁰ While Department of the Army Pamphlet 350-58, *Leader Development for America’s Army: The Enduring Legacy*, describes the Army’s formal leader development system as progressive – prepares leaders for increased levels of responsibility, complexity, and difficulty; and sequential – the next logical step in the education and training or assignment process builds upon the previous level – without large gaps. The interconnected and sequential pillars of leader development are institutional training and

education, operational assignments, and self-development.²¹ Although the organization selects leaders, they do so on merit and recognized abilities. Once selected, the organization has the responsibility to develop leaders through a continuing process of training, education, assessment and evaluation.

Assumptions. The following section will define some planning assumptions for the Strike Force's future environment, missions, and organization. Given these considerations from published documents, this monograph will then posit assumptions for the time period for evaluation, the future state of other similar organizations, and the ability for an organization to adapt. Following the assumptions and methodology, the next chapter will define in greater depth the purpose and function of the Strike Force. America will continue to defend its vital interests by maintaining sufficient power to play a decisive international role. This role for the United States will be to remain globally engaged, retaining the military power to support regional alliances and to deter or defeat major military competitors.²²

Military leaders will operate in an environment significantly different from today. The future military environment may be characterized by "expanded battlespace, urban or restrictive terrain, and multi-dimensional operations."²³ In a hostile, contingency force environment, the Army will prepare to address actions outside of the normal range of conventional combat, such as state sponsored or paramilitary group terrorism or information warfare. In a force projection scenario, the Army expects closure of the mission tailored, initial response force within ninety-six hours.

To answer these requirements, the United States Army will designate the Strike

Force to be a small, contingency force used primarily to enable early entry for follow-on forces, peace support operations, or to deter or contain a crisis. However, its roles and missions will cross the entire spectrum of conflict to include humanitarian assistance and high-end decisive operations if necessary.²⁴ The Strike Force will execute and control many operational tasks, such as autonomous movement and maneuver, deep fire support, logistics, and command and control for forces up to 15,000 personnel. It may serve as a subordinate element of a corps, land component, army force, or joint task force. The objective capability is for the Strike Force to serve as a joint task force headquarters or, with augmentation, a land component commander or army force commander.²⁵

The biggest changes will come through the confluence of advanced technology, smaller organizations, complex operations, and the individual soldier.²⁶ The Army will continue on its smaller, more lethal direction and no additional significant expenditures for expansion in the force structure is expected. Given the current fiscal limitations, the Army will establish a Strike Force Headquarters at Fort Polk, Louisiana with the current available technologies and personnel. The 2nd Armored Cavalry Regimental Headquarters, with its allocation of senior non-commissioned officers and junior officers, will serve as the interim headquarters. Given the interim Strike Force's role as a headquarters, it will have additional communications and intelligence assets that increase its ability to command and control forces within an expanded battlespace and between diverse forces that may not be similarly equipped. The Strike Force will use all developing technologies that increase air and ground mobility, speed, situational awareness, sustainability, and lethality.

Understanding these assumptions and limitations of the research, the year 2025

will serve as the baseline for this monograph. During the next two decades equipment will continue to get more technologically advanced as the Army continues to develop as an organization to meet the needs of a changing environment. Although the Strike Force may control any unit or type of forces, this Strike Force of 2025 is substantially different from the current composition, mission, and roles of the XVIIIth Airborne Corps, the Ranger Regiments, the Joint Special Forces community, or the Marines.²⁷

The leadership requirements for the Interim Strike Force Headquarters will be the same as Strike Force of 2025. The Interim Strike Force Headquarters will initially be an active component organization, but will transition to the Total Army either in part, such as specific combat support or service support elements, or in total, such as the enhanced brigades.²⁸ A discussion of the Strike Force capabilities and its leadership bridges both Force XXI and Army After Next, so there is no need to discuss in depth the specific requirements of each concept.

According to some organizational theorists it takes eight to ten years to change the culture of a large organization.²⁹ The Army, due to its size and mature culture, may take at least a full generation to adjust. The Army will focus its future training and education efforts on changing the perceptions of information age technologies, the speed of individual decision making, and the necessity of the integrating the Total Army. The current wave of digitization will not ebb any time in the foreseeable future. The Advanced Warfighting Experiment evidenced that the digitized command and control systems architecture could enhance simultaneous planning and execution if the staffs achieved greater proficiency. Although the present concern is for defining and developing an “adaptive leader” within the Strike Force Headquarters, the long-term

solution is for all members of the military to be critical thinkers and adaptive leaders.

Methodology. Given the brief discussion of Army doctrine, the focus of this research shifts to the concepts of the Strike Force within the context of Force XXI and the Army After Next. Subsequent to the doctrinal research, this monograph addresses the academic and technical information on individual development, the human thought processes, and leadership. Finally, this paper examines the anticipated future leadership requirements and evaluates those against the application of our current leadership doctrinal curricula.

The evaluation criteria for determining critical thinking of a Strike Force leader within the context of this monograph will be:

1. Depth. Depth of thought and decision making is not measured in terms of spatial battlefield relationships, but of completeness of thought. The ability to predict second and third order consequences and possibilities; thinking to achieve future results.

Depth of thought is seeing the linkages between objects and events, anticipating and making assumptions.

2. Versatility. Versatility of thought is the ability to discover unique, creative solutions to routine and ill-defined problems. There are many different ways to solve problems, and versatility of thought has always been akin to initiative in the U.S. Army. The diverse requirements of a power projection force in the 21st century demand versatile thought. There is no stated or perceived desire to create a computer-based solution set thereby limiting creativity and versatility of thought.

3. Agility. Agility is the mental acuity to solve complex problems quickly in order to control the tempo through actions that seize the initiative. There are many

models and paradigms that attempt to explain the thought process and expert decision making. Colonel John Boyd, a retired Air Force fighter pilot, studied the performance of successful aviators in air to air combat. His theory called the OODA loop is the central theme to the theory of maneuver warfare, act faster than the enemy until he no longer has the ability to fight.³⁰

4. Speed. In the data overload of the information age, too often the focus is on the "OO" of observing and ordering and not the "DA" of deciding and acting. Boyd's OODA loop is the basis for the joint definition of decision making cycle.³¹ However, it is becoming increasingly obvious that the requirement is to develop a faster human thought processor that can deal with complexity, ambiguity, and change. Boyd's focus was on acting faster, speed in this sense is to think faster with less mental resistance.

There are few protocols currently available that will quantify and qualify the linkages, patterns, and mental models used in the military thought process. This monograph will highlight a few of the many objective and projective tests used to measure individual development which have direct applicability to this study. Two such measures that focus on conceptual reasoning are the Measure of Epistemological Reflection (MER) and the Paragraph Completion Method (PCM). The question for this monograph becomes: "Does the military use such measurements in the selection process or as a means of evaluating success after education and training?" Rather than focusing on individual abilities and subsequent labels of performance, this monograph continues toward defining the organizational requirements to develop Strike Force leaders.

Chapter II. Why must a Strike Force leader be different?

How will a Strike Force function? The Strike Force would operate as, or a part of, a joint task force and be resourced and directed by a corps. This expansible headquarters would accomplish similar command and control functions of current U.S. Army division through “leveraging new technologies and multi-skilled soldiers.”³² The Strike Force, with a small, more junior staff, will rely upon senior non-commissioned officers and junior officers to conduct detailed planning and coordination currently reserved for more senior personnel in greater numbers. These Strike Force leaders must therefore possess a keen awareness of the world and know the role of military force in the world, to replace the experience and abilities of the robust staffs of the Army of Excellence. Given the future operational environment described in the preceding chapter and a smaller control staff, the duties and responsibilities for these junior Strike Force leaders increase to a higher, more sophisticated level. The result is junior Strike Force leaders have a requirement to have a broader understanding of war and the art of battle command, something that appears beyond the current scope of the battle staff officer course or the average advanced course. Just as successful military leaders of yesterday and today, all Strike Force leaders must have the intuitive skills of vision, innovation, adaptability, and creativity. As a staff and individuals, they must be able to clearly identify the problems, turning the complex into the simple, and the unintelligible into the plain – all within a very stressful environment.

The Strike Force’s core function and desired capabilities appear to rest at the operational level because every task contains the word “operational.”

1. Conduct operational movement and maneuver
2. Provide operational intelligence, surveillance, and reconnaissance
3. Employ operational firepower
4. Provide operational support
5. Exercise operational command and control
6. Provide operational protection³³

This does not necessarily indicate that the Strike Force commander will be the operational commander as currently understood, but does indicate that the Strike Force will have some responsibility for linking the military actions to the national purposes and objectives. The Strike Force concept addresses the requirement for the Army's medium weight, early or forcible entry capability, but also acknowledges a responsibility for immediate reinforcement of a light force in stability, support, offensive, or defensive operations.³⁴ The future role of the Strike Force may very well include participating in any military operation, home or abroad, with any combination of active and reserve component forces.

The Strike Force may operate anywhere along the entire anticipated spectrum of conflict. One may characterize the spectrum for the twenty-first century as inherently irrational, complex and uncertain. Leaders of the Strike Force will make difficult decisions in ambiguous situations, just as anyone else in the military, perhaps with more time or information, perhaps with less. Members of the military and those responsible for its oversight should not forget that wars are not, and will not be, rational or logical because of the affective moral domain of human beings.³⁵ The discussion in the next two chapters will highlight the specific decision making skills required in these situations.

The Strike Force may conduct combat, stability, or support operations within an

environment of states, organizations, or factions with different or opposing intentions or purposes which, if not understood, could lead to inadequate leader decision making.

However, complex decision making is not a twentieth century phenomenon. As Martin van Creveld said in the opening of *Command in War*, "The functions of command are eternal, but the means of command are constantly subject to evolution (organizations, procedures, and technical means)."³⁶ Within the context of this evolution, although "the information processing capacity of computers in command centers has grown exponentially, the perceived processing load has grown by a larger exponent."³⁷

Technology alone will neither solve every problem, nor will it create adaptive leaders for the Strike Force. It is up to the Total Army to develop its leaders to think and decide.

What are the leadership implications of a Strike Force? There may be significant challenges for Strike Force leaders in defining and developing a different pattern of thought to deal with the changing environment, increasing the speed of human thought and decision making, and facilitating a cultural change for the United States Army. There are different variables in future problems that were of little or no consequence to the lieutenant in the Fulda Gap along the Inter-German Border. The uniqueness and fluid nature of each environment, enemy, internal organization, and mission require that Strike Force leaders discipline their thoughts to guard against complacency, assumed familiarity, and artificially imposed limitations. The twentieth century U.S. Army expects this level thought, but not at the general grade requirements of the Strike Force.

Leaders of the Strike Force will see the battlefield and think differently in the year 2025. They will no longer look towards General Starry's AirLand Battle concept of a

deep, close, and rear configuration to comprehend battlespace. The ill-defined nature of our future environment requires a depth of thought to appreciate second and third order consequences, by anticipating, developing predictions, and quickly deciding. The framework for Strike Force operations may be delineated by time (current-future), function (engagement-sustainment), physical space (depth and simultaneous) or something entirely different.

Chapter III. What are the characteristics of a Strike Force Leader?

Differentiate between a leader and leadership. Before progressing with a discussion on the Strike Force leader, this monograph attempts to identify clearly the difference between dynamic interactions of leadership and individual leader characteristics. A leader may be in a position of power or authority based on rank, position, or informal agreement. FM 22-100, *Army Leadership*, blends three levels of leadership (direct, organizational, and strategic) into its discussion, as well as integrating leader actions with leader traits.³⁸ Given this doctrinal direction and the longstanding traditions of America's Army, our heritage is one that embraces a philosophy that all soldiers and civilians can be capable leaders and have the responsibility to demonstrate initiative, make sound decisions, and accept risk. FM 22-100, *Army Leadership*, currently promotes a single theory of leadership and leader development for the Total Army of the twenty-first century.

The Strike Force may initially place additional emphasis on the selection and recruitment of personnel based on the Special Forces model, but developing the mentality of an isolated, independent branch would most likely not facilitate the vision as a bridge

between mechanized and light forces. Given the U.S. Army's single doctrinal approach to leader development and to sustain the Strike Force capability and assist in the transition to the Army After Next, the institution will focus on training all its members to be capable of serving as part of the Strike Force. Just as high quality, successful soldiers can serve in either mechanized or light forces in the Army of Excellence, soldiers of the twenty-first century will possess similar leadership attributes that support Strike Force operations. The training and education base will address the requirements for the Total Force, not a specific branch or military occupational specialty.

Any definition of an abstract construct such as leadership, imposes limitations on the concept. Understanding these restrictions and the broader context of leadership in the twenty-first century, a definition of leadership may be expanded to interpersonal influence exercised in a situation to direct at least one other person toward the attainment of a goal (For a detailed discussion see Annex B. Leadership Theory). There are also two critical unstated areas within this definition, power and individual motivation. Power generally refers to the leader's ability to influence a person or a leader's potential influence over the attitudes and behavior of one or more designated target persons. Motivation may be defined as the sum of all internal and external forces that energize behavior, provide direction to that behavior, and determine the persistence of the behavior. Motivation is the why an individual acts or fails to act. It is also important to remember that the behavior of the leader, as well as the follower, is subject to individual motivation.

A key word present in this extended definition of leadership is "situation." This inclusion is extremely relevant and appears absent from the current leadership doctrine,

perhaps from a reluctance to get trapped into a debate on situational ethics or values. It is not the intention of this paper to convey a message that the leader is so malleable that he or she is inconsistent or unpredictable. In this leadership context a situation is the complex combination of the internal and external environment, the task, and the individuals. There are several concepts that are fundamental to an understanding of the situation. The world is not in a constant steady state -- people and the environment change. The leader must know the mission, the subordinates, and the environment to adjust to the dynamics of the situation or adapt the situation to him or herself in order to influence the "moving" target. However, for anyone to blanket all leader actions under the rubric of "adaptive leaders" is an over-simplification and an immediate distracter for the uniformed reader. Finally, there are few events, if any, that may ever be viewed in a vacuum. Single actions often have multiple consequences for the leader and the led and one should adopt a holistic view of leadership.

The effective characteristics of a Strike Force leader are probably best measured not by the positive attributes normally associated with organizational success, but by reactions to failure, change, and crises.³⁹ The willingness of the individual or group of subordinates to adopt the organizational goal as their own in the face of adversity is one of the greatest leadership challenges. The Strike Force leader expects to have uniquely tailored force for each mission, limiting the time for building cohesion and unit trust. The Strike Force leader expects to respond to global crisis situations with less than ninety-six hours to prepare and execute. The Strike Force leader expects uncertainty, ambiguity, and volatility in a high-risk, high-visibility mission.

Know what you know and know what you do not know. -- George S. Patton Jr.

Identifying the skills and attributes. Although “Knowledge and Speed” may have been the seminal paper on the Army After Next, the concept paper for the Strike Force could easily read, “Speed of Thought.” According to “Knowledge and Speed” the Army of 2025 “will achieve unprecedented strategic and operational agility by exploiting information technologies to create a knowledge-based Army.”⁴⁰ There will be more information available and information will flow rapidly to both soldiers and leaders as the tempo of future operations increases. The additional information has not led to a subsequent growth of knowledge because there appeared to be no increase in speed of human thought. Data alone is not knowledge. Information alone is not thought. If the Strike Force leader is to leverage the information technology to achieve dominance in every aspect from intelligence to logistics and from fire support to maneuver, the limiting factor appears to be how the human mind cognitively processes the wealth of data.

The primary skills necessary for the Strike Force leader appear to be to think faster, critically, and from multiple perspectives simultaneously. Extended operating distances and the resulting interpersonal dynamics of an increasingly empty battlefield may place additional stress on a lone, relatively junior, decision maker.⁴¹ It is from the perspective a complex, rapidly changing environment and these cognitive skills that one may see the linkage to the current discussions to develop an “adaptive,” “creative,” or “flexible” leader. The twenty-first century environment may challenge these attributes

(adaptive, creative, flexible) in different ways. A less experienced leader may be capable of executing autonomous operations, adopting multiple perspectives, and thinking creatively without having developed the depth of thought to appreciate second and third order consequences of the decision.

Skills. In general, skill may be defined as competent excellence fostered through the course of training, experience, or talent.⁴² In a most basic understanding of the future environment, Strike Force leaders may be required to think and decide faster than current Army leaders. The ability to think, or in academic terminology, cognitive ability is not a single skill, but rather an integrated skill set. One could examine the many facets of cognitive ability from a perspective of analytic, creative, and practical intelligence. Analytic intelligence involves the logical direction of our mental processes to solve a problem. Creative intelligence is the ability to adopt a different approach to a problem. Practical intelligence is gained through experiential learning.⁴³

Developing analytic intelligence is important for Strike Force leaders specifically because of increased levels of the responsibility with smaller units and a flatter command structure and the complexity of the expected Strike Force missions.⁴⁴ As the tempo of operations and the physical movement on the future battlefield increase, decentralization for decision making becomes an imperative. Leaders at all levels of the Strike Force must develop the analytic skills to support the intuitive skills that enable subordinates to act decisively.

The operating environment of the twenty-first century will be complex and present the leader with difficult, ill-defined problems. A task may be considered complex

based on the lack or abundance of information, the range of information, or how fast the truth changes. Given a potential reliance on information technologies and recent experiences in the Army Warfighting Experiments, information and data overload rather than knowledge and understanding may likely increase complexity. The Strike Force leader must train and prepare to face diverse enemies, in variable environments, on very short notice, and anywhere in the world. Throughout preparing for the Cold War against the Warsaw Pact, members of the American military conducted conventional and unconventional operations in such varied environments as Vietnam, Grenada, Panama, Somalia, Iraq, and Bosnia. However in the aggregate, the Strike Force leader at a comparable organizational level is expected to manage more tasks, external agencies, and assets, operate across a larger battlespace, with fewer troops, against a numerically superior force than before (See Annex C, Knowledge, Skills, Attributes, and Personality Constructs, and Annex D, Leader Dimensions, for a complete discussion on the traits of a Strike Force Leader).

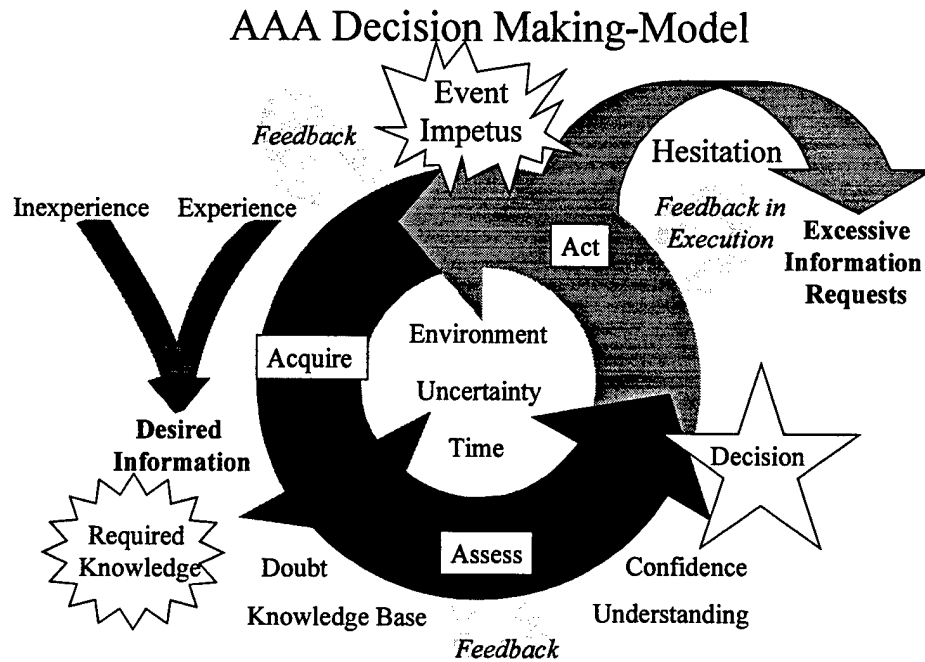
The Military Decision Making Process (MDMP) is an attempt to make ill-defined problems into well-defined problems through a discrete staff thought process. The Military Decision Making Process is, by definition, "A single, established, and proven analytical process. The MDMP is an adaptation of the Army's analytical approach to problem solving."⁴⁵ The process is time consuming but focuses on detailed integration, synchronization, and coordination. Experience in the decision making process develops the methods for asking the right questions, means of monitoring information flow, and knowledge of certain consequences. An ill-structured problem may just be a matter of the problem solver's ability to frame the situation and create a solution. The difficulty

remains that all the research indicates that expertise is highly perishable and domain specific and not transferable from one skill set to another.⁴⁶ The next chapter will discuss expert knowledge and decision making in detail, but for the purpose of concluding this section, it is therefore an unrealistic expectation that Strike Force leaders develop expert knowledge in multiple, diverse domains such as airborne operations, theater logistics, and the cultural heritage of Sub-Saharan Africa.

Military Decision Making. Decision making is not limited to the army staffs. Our nation expects a great deal from each member of her military, just as all proud states do. She demands that the military not make the mistakes of the last war. A state anticipates that armed forces assimilate the lessons from as many experiences as possible so as not to repeat the mistakes of others. It also expects the military to accommodate change by developing new procedures to address new problems. Given the rapidly changing world we live in today, a Strike Force leader must be able to recognize that alternatives are not given but must be sought in order to deal with the complexities of ill-defined problems. As Carl von Clausewitz wrote, "War is the province of uncertainty: three-fourths of those things upon which action in war must be calculated, are hidden more or less in the clouds of greater uncertainty."⁴⁷

As the military acquires increasingly sophisticated information processing technologies while conducting ever more complex and diverse missions of national security, there is a growing internal debate over the intellectual basis of decision making within the command and control (C²) process. There is no commonly understood vocabulary or framework for "analyzing, designing, or evaluating command and control

systems.”⁴⁸ However, each system, model or paradigm, may be reduced to the following:
 “(1) a mission is articulated, (2) plans are drawn and (3) operations orders are issued for execution.”⁴⁹



The diagram above is a depiction of the aggregate of command and control systems merged with individual decision making theory.⁵⁰ This paradigm may apply to the Strike Force leader as it takes into account indecision, inexperience, and uncertainty in a time constrained environment.

It may be a rational assumption that if uncertainty is fundamental in warfare, then the more information a Strike Force decision maker receives, the more uncertainty may decrease. However, as time increases, the uncertainty will normally approach some minimum value and the cost of gaining any additional information is very high.⁵¹ Often, the hands of fate close this window of opportunity before the uncertainty reaches an acceptable level for the decision maker. At the decision making level, we must remember

that we are dealing with an intelligent adversary and consider his possible reactions to our strategies.⁵² In the diverse and uncertain environment of the Strike Force leader, non-adversarial acts of nature or political decisions may also prematurely close the window of opportunity as well.

Gary A. Klein, President of Klein Associates, studying ways to elicit knowledge and applying these data for training, decision support systems, and expert systems suggested a recognition-primed decision (RPD) model of naturalistic decision making. "More than one strategy exists for making decisions. There are times when analytical approaches are best and other times when they are just not appropriate, and recognitional approaches are needed."⁵³ If a decision maker has the advantages of time and information, an analytical approach works best. If time is critical and the situation is ill-defined, a recognitional approach may achieve better results. Klein's research indicated that leaders relied on their experience to recognize an incident as familiar, carrying with it a typical way of reacting. "They told us that they rarely made decisions, which really meant that they rarely deliberated between options. There was not the time or the need. The vast majority of their decisions were made in less than one minute."⁵⁴

Klein concluded that, "The decision making process begins with a pattern recognition. The decision maker uses all of the experience gleaned from years of practice to view an event as typical in some way that resembles a judgment of prototypicality."⁵⁵ Other studies have shown that the analytical decision making process and strategy is not effective when there is less than one minute to respond.⁵⁶

Adaptability. Given a rapidly changing and uncertain environment a Strike Force leader must be adaptable and flexible. The Strike Force leader will encounter unique situations that will impose or require change in some shape or form. Change may be in the leadership style, the use of force, the climatic conditions of the region, or any other factor. However, for the purpose of this monograph and the efforts in defining adaptability, it may be a mistake to use the work of M. Mitchell Waldrop and Peter M. Senge grouping together both individuals and organizations. "Complex" and "adaptive" have almost become a compound word into today's business lexicon. There is great productive power within a learning and developing organization, but the Strike Force leader must be creative and anticipate more than react. The Strike Force leader may create a complex, adaptive organization, but as an individual one must be aware of and responsive to the environment, the mission, and the unit.

There is a debate within the legislature, as well as the Army, over maintaining combat readiness while deployed and conducting stability and support operations. A Strike Force leader must be flexible enough to do both -- warfighting and support mission -- as the lines between the two will continue to blur. The uncertainty and complexity of future requirements such as civilians, American and foreign, terrorists and transnationals, and multinational operations will most certainly require flexible, adaptable leaders.

Critical and Creative Thinking. Critical thought is a process characterized by sound reasoning and judgement. It entails analysis, synthesis, evaluation, and adaptive imagination in solving problems. "To become a critical thinker is not, in the end, to be the same person you are now, only with better skills, it is, in an important sense to

become a different person.”⁵⁷ The skill to think critically is a significant change of thought structure, from a single to a multiple perspective that truly allows for assessment and judgment by holding both positions simultaneously in one’s mind. Many developmental psychologists recognize this change as a major transitional stage of individual development and ethical reasoning. As our world may shift from single, linear thought patterns, the skill to think critically about how others may think and act in a complex, dynamic environment is an imperative for Strike Force leaders.

There is no pedagogical way to develop creative geniuses or to inspire seminal thought. However, creative thinking implies some degree of critical thought. In some respects, creating a cognitive response in search of a truth and then making sense of it is not an arbitrary exercise. Creative thought for the Strike Force leader should be a disciplined, logic based approach.

Creative problem solving rests in the realm of ill-defined problems and creativity is reflected in the production of novel, socially-valued products. This definition implies that creativity could be seen as the interaction of the following:

“Processes contributing to the individual’s capacity to generate new ideas or novel problem solutions; characteristics of the individual facilitating process operation; characteristics of the individual facilitating the translation of these ideas into action; attributes of the situation influencing the individual’s willingness to pursue these ideas; and attributes of the situation influencing evaluation of the productive effort.”⁵⁸

Until the old practices in education and training change to reflect the true dynamics of critical and creative thought, there will remain only the false appearance of a shift to critical thinking.

Chapter IV. What is and how do you develop a Strike Force leader?

A Strike Force leader should be an expert decision maker, with competencies in multiple domains. He or she should think faster and deeper, with far greater versatility and agility than what is required by the military. The objective goal for the military should be for every member of the Total Army in 2025 to be capable of developing into a Strike Force leader. This training and development is necessary because the environmental requirements for the Strike Force leader apply to all members of the Army After Next and not a single, elite force.

Expert Decision Making. Experts tend to have an ability to recall what they know, as well have a grasp of what they do not know – what information is required. One could view knowledge as a collection of beliefs with varying strengths of certainty and with some affective quality.⁵⁹ However, defining the continuum between a novice and an expert is not a matter of acquiring more information or mastering a particular skill set. In normal parlance, expertise develops as the amount of information stored increases within a field or domain and the knowledge becomes increasingly better organized.⁶⁰ The emphasis for developing a Strike Force leader is on critical thinking, which focuses on the combination of information and the organization of it -- the difference between knowing “what” versus knowing “how.”

In *Mind Over Machine*, Hubert L. and Stuart A. Dreyfus detailed five possible stages of knowledge acquisition: novice, advanced beginner, competent, proficient, and expert (See Annex A, Glossary for a brief explanation of the five stages). The basic premise of their book is the existence of a gradual process of development, “as human

beings acquire a skill through instruction and experience, they do not appear to leap suddenly from rule guided "knowing what" to experienced based "know how."⁶¹ Using four categories to delineate the individual's perspective and decision making process, Dreyfus and Dreyfus frame the distinctions between a detached, rule oriented novice and involved, intuitive expert.⁶²

The Dreyfus' work is relevant because of the distinction drawn between computing and thinking. There is more to intelligence than calculative rationality. Intelligence includes an area of thought beyond the conscious level. Although irrational behavior is not recommended, there may be a vast area of thought that could be referred to as "arational." Arational are those "actions without conscious analytic decomposition and recombination."⁶³ Experts appear to have this ability to process more abstract information without any apparent thought, similar to intuition.⁶⁴

One may describe and define an expert simply as a person with a special skill or technical knowledge in a specific field. Michelene T.H. Chi and Robert Glaser, in *The Nature of Expertise*, tie the study of expertise to the rise in cognitive psychology and artificial intelligence in the nineteen-sixties that was also the impetus for the development of studying mental models.⁶⁵ Glaser and Chi, both of the University of Pittsburgh, highlight and generalize on the relevant characteristics of experts.

1. Experts excel mainly in their own domains.
2. Experts perceive large meaningful patterns in their domain.
3. Experts are fast; they are faster than novices at performing the skills of their domain are, and they quickly solve problems with little error.
4. Experts have superior short-term and long-term memory.
5. Experts see and represent a problem in their domain at a deeper level than novices; novices tend to represent a problem at a superficial level.
6. Experts spend a great deal of time analyzing a problem qualitatively.
7. Experts have strong monitoring skills.⁶⁶

If these are the general abilities of an expert, what makes an expert decision maker? Essential to this discussion are: the ability to develop large patterns, superior memory skills, the ability to examine problems at the complex level, and the practice of spending more time identifying the problem. These four topics deal primarily with how information may be organized.

Andrea A. diSessa of MIT points out that the “difference between novices and experts, indeed between common sense and scientific reasoning, ... is not so much the character or even content of [their] knowledge, but rather its organization. Experts have a vastly deeper and more complex priority system.”⁶⁷ Whether in chess, physics or electric circuitry, the body of research demonstrates experts perceive and process patterns of information that represent functional units in their domains. Experts “see” systems in groupings, understand the linkages that hold the system in place, and do so with a great deal of confidence. Novices lack this ability.⁶⁸

Expert knowledge may also rest more in an elaborate semantic memory than in a general reasoning process. Patterns and models are coded through heuristics. Individuals demonstrate such knowledge and recall, not only in what may be considered the domain of expert performance, but also in a fundamental skill like reading. The varying degrees are whether one sees curved and straight lines, to letters forming words, to complete words, to complete sentences or paragraphs or pages. The expert is readily able to access a “complex network without any conscious representation of the search processes that go on in its retrieval.”⁶⁹ The challenge to produce an expert may not be in selecting a person

who has a special ability, but to create and maintain the motivation needed for long-term training to master the skills.⁷⁰

Superior memory skills are related to the ability to perceive large patterns in a domain. Experts exploit long term memory to expand working memory capacity in terms of three principles of skilled memory: mnemonic encoding, an advanced retrieval structure and a rapid processing system.⁷¹ Most research indicates that the average human being can recall or maintain up to ten independent items within their active memory at a given point in time. Through the principles of skilled memory, those ten items could be an encoded message holding a thousand other pieces of information. Skilled memory theory holds that, in principle, people can learn to hold virtually unlimited amounts of information in their active memory with sufficient practice.⁷²

Most of the research indicates that expert performance on “easy” problems may be attributed generally to memory. However, memory is a developed skill and one of the best illustrations of expert decision making and the power of memory is the game of chess. Herbert Simon, noted organizational psychologist and author, reasoned that masters level chess players spend between 10,000 to 20,000 hours staring at chess positions. This could equate to wargaming a battle with arrayed forces for forty hours per week for thirty-three weeks for ten years. Simon also went on to add that a master has committed to memory about 50,000 visual patterns of the chessboard and pieces.⁷³

Memory and large patterns alone would not allow an expert to solve complex problems. Eric J. Johnson, of the Wharton School, University of Pennsylvania, wrote that experts in general appear to make more accurate decisions than do other people in environments that are characterized by uncertain information. Experts solve complex

problems because they search for different information (focus on diagnostic information), with different patterns of search (active, flexible).⁷⁴ Experts do not rush into solving the problem, they focus their initial efforts on problem identification.

Given these general qualities of experts, what then are the problem solving techniques of experts versus novices? Because of an ability to rapidly perceive a complex situation and modify mental models to meet varied perceptions and patterns, the expert can adapt easily and infer to the unclear situation, changes in rules, or whatever. The novice struggles with unclear problem presentation. "The combination of more abstract knowledge and greater connectivity of knowledge means the expert is able to make more inferences than the novice."⁷⁵ Novices and experts tend to use similar problem solving strategies when faced with simple problems in a common domain. However, the expert's knowledge and organization normally permit greater agility, speed, and depth in the generation of a solution set.⁷⁶

Strike Force leaders who will operate in the realm of expert decision making, do so not due to the certainty of all possible data, but through the development of pattern recognition and the confidence in their intuition. For those who do not demonstrate expert decision making skills, there may be a danger that the sheer wealth of information collection and processing devices to gain certainty will overwhelm analysts and intelligence systems with data. If the analysts fail to analyze, synthesis is not likely to occur and useful information will not be available for the decision maker. This would then add to the complexity and uncertainty that are already characteristic of military operations.

Expert decision making is a desired skill for members of the Strike Force.

Decision makers develop from novice to expert ability through disciplined mental training designed to improve memory, focus on problem identification, and examine complex situations. Machines are more than able to approximate competent human decision making. However, computers lack intuition to solve ill-defined problems that we expect in the twenty-first century, which lack rules or predictability. The realm of military decision making lies primarily in the uncertain, the ill-defined, and the unpredictable realities of human interaction.

“By definition we cannot teach original behavior, since it would not be original if taught, but we may teach the student to arrange environments which maximize the probability that original responses occur.” B.F. Skinner

Identification, selection and development. Behaviorist B.F. Skinner noted the apparent paradox between structured learning and original thought. It is through education and training that the Army as an organization will attempt to develop Strike Force leaders as it has in the past. An unanswered question at this time is will the Army select Strike Force members throughout the lifecycle of the organization, such as with Special Forces or Delta, assess members in as branch or functional area, or have a rotational replacement system similar to what we currently see in most army units?

The Army may develop a series of tests to evaluate subject matter competencies and tacit knowledge. Tacit knowledge may be defined as “action-oriented knowledge, acquired without direct help from others, that allows individuals to achieve goals they personally value.”⁷⁷ The problem with evaluating tacit knowledge that it is unspoken, under emphasized, and may even be poorly conveyed relative to its importance for

practical success. Tacit knowledge required for some skill domains or tasks may be common with others, but it really has nothing to do with a classroom or a job. "Tacit knowledge can be taught, although when it is taught it may cease to be tacit. Tacit knowledge is best taught through modeling and simulation, rather than through direct instruction."⁷⁸

Mental ability is the best available predictor for technical proficiency and is therefore a focus of entry level selection, whether for an enlisted soldier, officer candidate or civilian.⁷⁹ One could also develop assessment and evaluation mechanisms based on leader competencies. Communications, supervision, teaching and counseling, soldier team development, technical and tactical proficiency, decision making, planning, use of available systems, and professional ethics are used in our current systems, as well as by many external organizations. Additionally, given the respect for others program and the diversity of mission requirements for the Strike Force, understanding and communicating cultural differences among our own soldiers, of other nationalities, and of government and non-government agencies is an identifiable skill and attribute.⁸⁰

There may be as many as thirteen leadership behavior dimensions related to creative problem solving. Identifying these dimensions in the selection process for Strike Force leaders is important, but it is equally as critical to foster these skills through education and training in the development program. The dimensions are as follows:

"Acquiring information, organizing and evaluating information, giving feedback and maintaining control, identifying needs and requirements, planning and coordinating, communicating information, obtaining and allocating personnel resources, developing personnel resources, motivating personnel resources, utilizing and monitoring personnel resources, obtaining and allocating material resources, maintaining material resources, and utilizing and monitoring material resources."⁸¹

Education. Higher level, professional education entails imparting instruction that facilitates student mastery of domain specific knowledge and abilities, but also the foundation, direction, and skills to solve complex, ill-defined problems.⁸² With respect to both learning and intellectual development, however, the evidence is convincing that certain kinds of students benefit more from certain kinds of instructional approaches than they do from others. These advantages are especially apparent with instructional approaches that rely on small, modularized content units, require a student to master one instructional unit before proceeding to the next, and elicit active student involvement in the learning process.⁸³ The Army wide movement to small group instruction for most all centralized educational programs in the past decade reflects this observation. The United States Army has a multi-disciplined, career long developmental system that is a combination of military schooling and individual development programs that include both formal and informal mentorship.

The Army affected a series of changes in its military school system instructional philosophy over the past decade that includes smaller classes, discussions, and video and computer based instruction. The body of evidence also demonstrates substantial advantages over traditional teaching formats have been shown to be associated with a variety of individualized approaches, particularly the personalized system of instruction. The Keller Plan, which involves (among other things) having more-advanced students assume helping roles when other students have difficulties with course material, is embedded in the military ethos from basic training.⁸⁴ The movement away from

academic competition to cooperation enhances soldiers teaching soldiers, which then leads to development programs within staffs, squads, and other small units.

Educational research also indicates that instruction stressing inductive learning based on concrete activities appears with some consistency to promote gains in abstract reasoning and cognitive complexity.⁸⁵ Inductive reasoning is a logical process in which an individual reaches a conclusion that contains more information than the observation or experience on which it is based, what may be considered "outside the box thinking." Inductive reasoning is a critical skill that facilitates visualization, anticipation, and imagination. Deductive thought skills are important and necessary within a complex organization. However deductive skills focus solely on the facts and premises within the problem set. If the military is truly to develop proficient or expert initiative oriented thinkers, the learning model practiced within the formalized school system at all levels beyond the basic should change from deductive based thinking to the inductive based.

Remote and distance learning may be more cost effective, but is not as educationally effective as other techniques. The Armor and Military Intelligence Schools developed digitized support packages and offer extensive on-line support for training programs. General Montgomery C. Meigs, former commander of Combined Arms Center, developed the concept of the "University After Next," complete with a virtual library and automated resources.⁸⁶ The question for the military is what is good enough? Visual-based Instruction (VI) consists of mainly films, slides tapes, and other video technology. Although favored by the students over conventional instruction, VI does not help attitude toward the subject matter material. The unsupervised execution of computer exercise will not achieve cybernetic mastery because there is no critical evaluation of and

challenge to a thought process. Visual-based Instruction also shows no significant increase in academic performance over conventional methods.⁸⁷

Most American military schools use small group instruction and the adult learning model. Each school has a unique blend of senior and junior military officers as well as civilian professors who compose the faculty. However, because of a lack of instructor knowledge and ability in the art of teaching, many classes still focus on the procedural matters and rely heavily on the lecture format. Some instructors rely on view-graphs and discussions of historical examples and do not focus on the learning process or objectives. Instructors use these techniques not because of curriculum design, but rather because they rely on what they know. Faculty will only develop teaching expertise through education and mentored practice – truly a skill required of a military artist.

Creativity and critical thought require a directed effort and time to develop. Critical thought could be seen as thinking about thinking, developing the cognitive tools of reason and logic from multiple perspectives. John Adair's work, *Training for Decisions*, addressed the dimensions of developing creative thought citing the work of Edward de Bono. Bono introduced a concept of lateral thinking to capture the spirit of creative thought. The human mind does not necessarily think sequentially. Bono posited that vertical thought is akin to digging a hole deeper. Lateral thought is, "realizing that you cannot dig a hole in a different hole in a different place by digging the same hole deeper."⁸⁸ In other words, the same solution does not always apply and lateral thinking will enable the mind to view the problem from another perspective. Adair's conclusion was similar to Martin van Creveld's in *The Training of Officers* and Frederic Brown's *The U.S. Army in Transition II*. Intense leader training begins with high quality

instructors who first challenge conventional the thought processes, then focus on the rapid assimilation and synthesis of new information to achieve expertise.⁸⁹

A successful developmental program that fosters inductive reasoning and initiative involves everyone. Classroom activities that require student participation, topical discussions, assignments that call upon higher-order thinking, problem-solving activities, in-class presentations, and student involvement in decisions about course content and activities appear to promote course involvement.⁹⁰ The synergistic effect of students thinking collectively and solving complex problems through a mentor led dialogue may be seen as the basis for the adult learning model. This concept of education stands in contrast to any misperceptions that the adult learning model is a solitary effort in reading, lectures, and discovery learning to achieve subject matter competency.

Constructivist theory is enjoying a return to discussions of higher education in recent months. The approach fits well with the adult learning model and the Socratic method. Given the incredible increase in information available resulting in new learning goals and objectives, educators are using information age technologies to support the learning process. Instructors employ a multidimensional structure to access knowledge randomly, not linearly. Constructivism may be seen an alternative method to the Army's objectivist, instructivist, and generally behaviorist approach to education.⁹¹

Constructivism and Cognitive Flexibility Theory of education support an understanding of and development of tools for cognitive apprenticeship. This "virtual apprenticeship" model requires that all instruction take place within a rich, authentic context. In this context, the student must have opportunities to form hypotheses about complex situations, gather data, look at problems from multiple perspectives, and try out

a variety of solutions. Constructivism supports a transition to adopting a more holistic view of the environment and a flexible approach to decision making. Only by providing training tools that support this kind of sustained exploration can we expect the advanced student to gain the cognitive skills necessary for future performance in high cost settings. Training development should include the elements listed below.⁹²

Elements of Training That Support Advanced Cognitive Skills Development

- ✓ Overarching, Authentic Context
- ✓ Visual Representations, Not Text
- ✓ Multiple Perspectives
- ✓ Interesting, Complex Problems
- ✓ Facilitation to Push Officers Past Current Understanding
- ✓ Learner Control of Exploration of Concepts
- ✓ Multiple Iterations
- ✓ Continuous Opportunities for Self-Assessment
- ✓ Opportunities to Test Skills in New Contexts

Training. The human mind will remain the critical dimension on the battlefield, so our next question is how do we train the minds of Strike Force leaders? Training is a series of related events designed to develop habits of thought and behavior through instruction and practice.⁹³ Training the mind to adapt to information age technology must be a matter of developing competency, proficiency, and then expertise, without chaining the commanders or the staff to command posts and video monitors. As discussed in the learning process and education, analysis and synthesis – the dialectic process of transforming data into understanding; information into knowledge – generally do not occur without mentored guidance or structured thought. Repetitious, realistic training will develop initiative, expert decision making, anticipation, and imagination.

Expert knowledge may develop through repetitious training in realistic situations across the entire spectrum of conflict. The limitations to fostering experts are obviously time, resources, and imagination. Training simulations provide military leaders with opportunities to exercise decision making skills and then reflect on their thought processes. These simulations include constructive (computerized wargames that model units and focus on command and staff functions), virtual (integrated machines that focus on smaller units, staffs, and crews), and live exercises (such as those conducted at local installations or the National Training Center). The Battle Command Training Program supports the training of higher echelon commanders and staffs through the application of complex problems, under the pressure of time constraints, and, most importantly, with an external, mentored evaluation of the individuals.

Assessment Mechanisms. The following paragraphs highlight some of the measurement devices available to assess how an individual thinks (For a more comprehensive discussion see Annex E, Assessment Mechanisms). The current body of military research has focused primarily on the results of the leader's decision, rather than the thought process used to arrive at that decision. Although there are a few researchers working the issues of assessment for the Army, there is no single, valid measurement index at this time. If the military adopts an external assessment or series of assessments, the questions then become does the Army really want to know the answer to someone else's test and how valid are the results for military members? There are a few well established tests that may be given to assess critical and creative thought in Strike Force leaders beyond observed behavior or inflated opinions in efficiency reports.

The **Analysis of Argument Test (AOA)** that seeks to look at the quality of sound reasoning and critical thinking about issues with no verifiable solution. The AOA looks at more than one side and asks the recipient to argue both sides to see if he or she can look at the issue from more than one perspective. The **Reflective Judgment Interview (RJI)** is based on the Perry scheme of ethical and intellectual development, and is widely used to test sound reasoning and the use of evidence to support conclusions.⁹⁴ Reflective Judgment is defined as a form of justification based on the principle that knowledge and statements must be evaluated as more or less likely to the truth and that they must be open to the scrutiny and criticisms of other rational people.

Another significant effort in expanding the Perry scheme is the **Measure of Intellectual Development (MID)**. The MID is an essay based test consisting of three short essays scored according to how one construes the nature and origin of knowledge and responsibility in decision making. The MID was developed as an alternative to the costly and time consuming interview methodology of Perry. It is structured around a single open-ended question in essay form that probes a variety of content areas such as course work, decision-making, and career choice.

Additionally, the **Measure of Epistemological Reflection (MER)** is a test for post-formal reasoning based on the first five stages of the Perry scheme. The MER is a written instrument that assesses the respondent's views in six domains of thinking related to learning and elicits specific justification for the respondents' thinking. The **Paragraph Completion Method (PCM)** is used to test the ability of an individual to deal with complexity by creating systems of thought and synthesizing large amounts of complex

information. The PCM is a semi-projective measure designed to test conceptual level by having subjects complete sentence stems.

Assessing how an individual thinks through a comprehensive and systematic approach of projective, semi-projective, and objective tests, requires a considerable institutional resource investment and effort in terms of time and manpower. The most telling question relative to changing the developmental model of the Army is not can someone measure and assess the decision making thoughts of its leaders, but whether the military desires to know and can accept the answer. A rapidly changing global environment and America's military strategy of engagement dictate that all leaders of the next century possess the reasoned judgment and critical thought that may be developed and evaluated through realistic training, disciplined education, and mentored discussion.

Chapter V. Conclusions and Recommendations

The Strike Force will target "the most adaptable part of our Army – the soldiers, the leaders." "What we want to do is be able to put the right kind of training and leader development together so we have given them the right set of skills and knowledge. It'll give us insights into how you grow those leaders."

-- Major General Daniel Zanini, TRADOC Deputy Chief of Staff for Combat Developments.

America's Army will possess creative and adaptive leaders in both the Strike Force of Force XXI and the Army After Next, just as it has for the past two centuries. However, it may appear that the U.S. military remains institutionally trapped in an industrial age paradigm in terms of decision making as well as leader selection over development. This factor is a significant barrier to complete integration of critical thinking strategies required to develop Strike Force leaders. The cognitive developmental

emphasis for training and education should be on critical, reasoned thought and the mechanisms to assess it. Additionally, given an overall reduction in military forces and a subsequent increased reliance on reserve forces, the emphasis in the leader lifecycle should shift to a rapid, cognitive maturation process over a hierarchical promotion-based selection process for the Total Force.

The military must recognize the reduced planning horizons of future situations. A leader may only have an hour or less to make the one decision that really matters. This is a mental agility to solve complex problems quickly in order to control the tempo through seizing the initiative. The future will not stand still and wait for anyone. America's military must develop the ability to command on the move. Power projection implies a rapid movement to a foreign area of operation. There will be very limited time before the decision may be obsolete.

The Army should focus its future efforts on changing the organizational misperceptions against information-age technologies, a belief that human decision making cannot be faster, and that education is an assignment not a learning experience. The "How to Think" approach to leader development, can no longer be orthodoxy masquerading as reform.⁹⁵ Future integration begins with the development of educated and motivated instructors at all levels of education, not the material or elective course offered. Developing Strike Force leaders who can critically assess complex situations, develop creative solutions, and execute successful operations in challenging environments takes time and a disciplined approach to education.

There are many questions concerning the Strike Force Concept and the future of the Army After Next, both internal to the Army and from our nation's leadership. The

Army has the ability to develop creative, adaptive, flexible leaders for the twenty-first century, just as it has institutionally done for the past fifty years. However, the depth and extent of this affirmative answer lies within the context of a discussion on military education and training. The military education system should develop the abilities, skills, and skill sets that instill a thought process and not merely memorization. Depth and versatility of thought, along with mental acuity and agility arrive from a program that emphasizes inductive reasoning, creative thought, and complex problem solving.

If the educational intent of military professional development is to share information and expand the available resource base, the Army should continue to develop computer assisted learning programs. However, if the goal is to develop initiative and creative thought, the military needs to develop a more inter-active, thought provoking exchange. Examples include an electronic chat room or web-based bulletin board that offers free, but mentored dialogue. With respect to the quantitative advantages of computer generated information, the mental activity of creativity should not be confused with the commodity oriented concept of productivity.

The same philosophy of training used in unit level tactical exercises should be used in the school environment. A series of original exercises could be designed to prepare the leadership to anticipate, manage, and exploit change. Institutions develop exercises specific to their training needs, be they tactical, operational, strategic, or logistic in nature. This could be done by situational exercises that lack definition and change in mid-course.⁹⁶ Once a student solves a problem, give it again with minor changes and only accept a different solution. Computer generated simulations allow many iterations of leadership training exercises to occur at relatively low costs. The generation of

multiple activities will assist in developing expertise in problem identification and decision making. However, the challenge for the military remains to provide mentored observation of as many different patterns and scenarios as possible.

An option for improving the education process to meet the challenges of the uncertain future environment is to invest in the development of the facilitators. There are many dedicated, developed, and disciplined instructors in the school system. But there are also instructors at the service schools who are weak in terms of quality and expertise as teachers, and in some cases as military professionals.⁹⁷ As a simple consequence of motivation, if the members of the profession view an instructor position as meaningful and reward excellent performance, more members will pursue positions in the school system. If the Army chooses instructors from a centralized board process and develops each one through advanced civil schooling, the quality of instructors will increase. As the quality of facilitators increases, the military's attitude towards education should also improve. Understandably, the cost of upgrading the faculty is significant. However as the military prepares for the requirements of the twenty-first century, the institution cannot afford to focus on filling minds with information without developing a proper compass to use that information.⁹⁸

The military training system may develop expertise, initiative, and speed in decision making. Anticipation, imagination, agility and speed of thought mature though repetitious, realistic training across the entire spectrum of conflict. Education and training together develop the necessary skills and skill sets for Strike Force leaders. A cognitive assessment mechanism of some type will be necessary to establish both the

training and education requirements until the force matures and more of the Total Army becomes immersed in Strike Force doctrine and training.

The Army must develop Strike Force leaders at the junior officer and non-commissioned officer level that understand the role of military force in the world, to replace the experience and abilities of the robust staffs of the Army of Excellence. Given the future operational environment, the duties and responsibilities for these junior Strike Force leaders increase to a higher, more sophisticated level of thought and execution. Strike Force leaders will require a broad understanding of war and the art of battle command, something that appears beyond the current scope of the battle staff officer course or the average officer advanced course. Strike Force leaders must have the intuitive skills of vision, innovation, adaptability, and creativity. As a staff and individuals, they must be able to clearly identify the problems, turning the complex into the simple, and the unintelligible into the plain – all within a very stressful environment.

The training for Strike Force leaders should similarly present decision makers with as many situations and variables as possible to force decisions again and again – this takes time and practice. Second, a skilled mentor should conduct a dialogue with the individual to determine the thought processes used and ways to improve. The leader develops the abilities and skills to form new patterns, linkages, and predictions based on the experiences. Information technologies and simulations serve only to enhance decision making capabilities, not supplant them. Depth, agility and versatility of thought arrive from a program that emphasizes inductive reasoning, creative thought, and complex problem solving. Expertise, initiative, and decision making skills evolve through repetitious, realistic training across the entire spectrum of conflict.

The military, in developing the concepts for the Strike Force, should not place a restrictive adjective, such as "adaptive," when defining leader development and leadership for the next century. The leadership process is too complex to expect a single word, no matter how eye-catching or en vogue, to encompass everything required upon a leader. Yes, a successful Strike Force leader must be adaptive, but one must also be creative, flexible, and agile. The Strike Force leader must be an expert decision maker, able to adopt a systems approach to multiple domains faster than we currently think. The twenty-first century leader of character and competence should be a jack of trades and a master of all trades.

Endnotes

¹ Department of the Army, Training and Doctrine Command, Center For Army Lessons Learned, Division XXI Advanced Warfighting Experiment (DAWE), Initial Insights Report (IIR), Fort Leavenworth, Kansas, 21 January 1998. The Task Force and Division Advanced Warfighting Experiments conducted at Fort Hood, Texas and the National Training Center, consisted of live and constructive simulations from March 1996 through June 1997. These were not controlled operational tests, but rather a free-play experiment during which the primary goal was to obtain insights in Information Age capabilities.

² Department of the Army, Headquarters, Training and Doctrine Command, TRADOC Pamphlet 525-5, *Force XXI Operations – A Concept for the Evolution of Full-Dimensional Operations* (Fort Monroe, Virginia: 1 August 1994), iii, 3-1 through 3-3. The future Army -- Force XXI -- must be prepared to face the full spectrum of operational environments. Force XXI Operations is a concept for the evolution of full-dimensional operations for the strategic Army of the early twenty-first century. Force XXI Operations is centered around quality soldiers and leaders whose full potential is...realized through information age technologies and by rigorous and relevant training and leader development.... It describes an operational environment where the acquisition, processing, and rapid sharing of information revolutionizes the conduct and tempo of operations.... To win on future battlefields, future leaders...must be skilled in the art of military operation, [and] capable of adjusting rapidly to the temporal and spatial variations of new battlefields.

³ Department of the Army, Chief of Staff. Army After Next Project, First Annual Report, Washington D.C., June 1996. "Discussion in military affairs [of the 2010-2025 timeframe] has centered around the impact of technology on weapon systems, but a more profound level of efficiency will derive from new organizational structures and training strategies that promise to leverage and capitalize the most from new technologies."

⁴ Department of the Army, Headquarters, Training and Doctrine Command, TRADOC Pamphlet 525-5, *Force XXI Operations – A Concept for the Evolution of Full-Dimensional Operations* (Fort Monroe, Virginia: 1 August 1994), 1-1.

⁵ The Strike Force "will have the ability to deploy, almost immediately, a lethal, modular force, tailored to operational requirements, and able to sustain itself and survive until mission completion or follow-on forces arrive." In "Reimer unveils Strike Force at AUSA symposium," AUSA News, Volume 21, Number 6, April 1999, 3. Also appeared conceptually in Strike Force Operational and Organizational concept papers and briefings, dated December 1998 through March 1999.

⁶ Colonel John N. Greely, trans., *Battle Studies: Ancient and Modern Battle*, by Colonel Ardant du Picq in *Roots of Strategy, Volume 2*, (Harrisburg: Stackpole Books, 1987). Colonel du Picq's comment from over one hundred years ago still rings true, "Man is the fundamental instrument in battle," 30.

⁷ Department of the Army, Headquarters Training and Doctrine Command, Field Manual 22-100 *Army Leadership*, (DRAG Version), (Fort Leavenworth, Kansas: November 1998). **Direct Leadership:** The face to face, first line leadership is direct. It takes place in organizations where subordinates are used to seeing the leaders all the time: teams, squads, sections, platoons, companies, batteries, troops, even squadrons and battalions. The direct leaders span of influence, those lives he can reach out and touch, may range from a handful to several hundred people. **Organizational Leadership:** Leaders at the organizational level influence several hundred to several thousand people. They do this indirectly, generally through more levels of leadership than direct leaders. Organizational leaders have staffs to help them lead their people and manage their organizations' resources. The skill domains are the same as the direct leader, but organizational leaders deal with inherently more complexity, more people, greater uncertainty, and a greater number of unintended consequences. Organizational leaders include military leaders at the brigade through the corps levels.

⁸ Department of the Army, Field Manual 100-22, *Army Leadership* (DRAG version) (Fort Leavenworth, Kansas, November 1998), Appendix F, The Constitution of the United States.

⁹ Department of the Army, Headquarters, Field Manual 100-1, *The Army*, (Washington, D.C., 14 June 1994), 3-4.

¹⁰ Department of the Army, Headquarters, *Army Strategic Planning Guidance*, 1999, Coordinating Draft, as of 23 December 1998, 1.

¹¹ Department of the Army, Headquarters, Training and Doctrine Command, TRADOC Pamphlet 525-5, *Force XXI Operations – A Concept for the Evolution of Full-Dimensional Operations* (Fort Monroe, Virginia: 1 August 1994), 1-1.

¹² "U.S. Army creating rapid strike forces," February 16, 1999. Internet article at <http://cnn.com/US/9902/16/army.restructuring/index.html>. Also appeared on the Strike Force Home Page, quoting General Reimer. Internet article found on 22 February 1999 at <http://www-tradoc.monroe.army.mil/pao/info.htm>. Similarly in an article by Sean D. Naylor, "Reimer defends Strike Force headquarters," *Army Times*, January 18, 1999.

¹³ Strike Force Home Page, quoting General Reimer. Internet article found on 22 February 1999 at <http://www-tradoc.monroe.army.mil/pao/info.htm>. Additionally in AUSA News, Volume 21, number 6, April 1999, unsigned article, 3 and 21.

¹⁴ Sean D. Naylor, "Reimer defends Strike Force headquarters," Army Times, January 18, 1999, 14. Quoting General Dennis J. Reimer's response on 7 January to an Association of the U.S. Army (AUSA) audience in Arlington, Virginia following his comment that the Strike Force was not intended to be a new armored cavalry regiment, but rather a more adaptable force with multiple functions to meet different threats.

¹⁵ Thomas Carlyle's Great Man Theory of Leadership (Page 1-4, USMA Leadership text book) His argument was simply that great men with certain charismatic qualities were able to shape the course of history. The study of great leaders tended to generate lists of personal characteristics. Once you had the list of defining characteristics for a great leader, you then could select individuals with the requisite qualities or train people specifically to develop these attributes. In his 1948 attempt to validate the trait theory of leadership, Ralph Stogdill of The Ohio State University, concluded that "a person does not become a leaders by virtue of the possession f some combination of traits." (1-5) The counter argument to the great man theory in the nineteenth century was Marx, Engels, Hegel, that history thrusts greatness upon men. Although the situationalist approach has some merit, a pure approach does not explain why a person may rebuild an ineffective organization and why some people may never be able to lead an effective organization

¹⁶ Department of the Army, Field Manual 100-22, *Army Leadership* (Fort Leavenworth, Kansas, January 1999), 1-2.

¹⁷ General Dennis J. Reimer, "The Army is People," Army Magazine, October 1998, Volume 48, number 10, 17-26.

¹⁸ Department of the Army, Field Manual 100-22, *Army Leadership* (Fort Leavenworth, Kansas, January 1999), B-1.

¹⁹ Department of the Army, Army Regulation 600-100, *Army Leadership* (Washington, D.C., 17 September 1993).

²⁰ Department of the Army, Department of the Army Pamphlet 600-3, Commissioned Officer Professional Development and Utilization (Washington, D.C., 30 September 1986), 6.

²¹ Department of the Army, Department of the Army Pamphlet 350-58, Leader Development for America's Army: The Enduring Legacy (Washington, D.C., 17 September 1993), 1-4

²² The White House *National Security Strategy for a New Century*, (October 1998), iii-iv, and 5-8. Joint Chiefs of Staff, *National Military Strategy*, (1995), executive summary. Headquarters, Department of the Army, *The United States Army Posture Statement FY 99*, (February 1998), iii, 14, 27-33.

²³ TRADOC Pamphlet 525-5, Annex A Glossary. **Multi-Dimensional:** Force XXI will operate in an expanded battlespace. This battlespace goes beyond the traditional physical dimensions of width, depth and height. It includes portions of the electro-magnetic spectrum. This extends beyond the physical boundaries of the division through its communications and digital connectivity to other Army, Joint and Coalition elements, even reaching back to CONUS from the Theater of Operations. Battlespace will also be defined by the human dimension; this includes not only soldiers and leaders, but also the civilian population in which operations are being conducted, citizens and families in the United States, and the peoples of the world. Finally, time is a dimension of battlespace that must be mastered. This concept seeks to seize and exploit the initiative to set the tempo of a battle, not just acting faster than the enemy, but acting at that speed which is best for execution of the friendly plan. Battlespace will generally be framed by METT-T and largely shaped by corps or JTF operations. This shaping includes not only the application of fires and combat power, but also deception, PSYOPS, civil affairs, host nation support, sustainment, intelligence, and reinforcement of existing terrain and infrastructure. Also appears in an Operational and Organizational Concept paper undated and unsigned, 1.

²⁴ Michael G. Rumsey, "21st Century Lieutenants," (U.S. Army Research Institute, Fort Leavenworth, Kansas, 1999). Diversity of missions. Sullivan and Harper noted the recent shift from operations consistent with the Cold War model of the Army to operations which included "humanitarian assistance in Somalia and Rwanda; disaster relief after Hurricanes Hugo, Andrew, and Iniki; peacekeeping in Macedonia and the Sinai; deterrence in Korea and Kuwait; riot control in Los Angeles; refugee operations in Turkey, Cuba, Panama, and elsewhere; support for the United Nations; fighting forest fires and environmental disasters; and a host of other national and multinational operations." While it is difficult to project whether the trend toward greater diversity of missions will continue, there is a reasonable basis for believing a single model of operations is no longer viable.

²⁵ Operational and Organizational Concept paper undated and unsigned.

²⁶ Rumsey. Technology. Our leaders will work in an environment where military units will use advanced automated decision-making tools using enhanced artificial intelligence. Training methods may be transitioning from simulated to virtual. Robotization will have a significant impact on doctrine and tactics, techniques, and procedures. Precision strike capabilities may allow us to pre-empt an opponent as soon

as his intentions are discerned, possibly precluding hostilities. Conversely, U.S. forces may be extremely vulnerable once they enter the theater of operations. **Organizations.** Indications are that our organizations may become flatter, increasing the span of control between leader and led. Additionally, the distinction between military and civilian personnel will be lessened, presumably, as we rely on civilians for logistical and technical support. **Operations.** Although we don't anticipate much difference in the type of operations we will conduct (primarily response to military and humanitarian contingencies), the characteristics of those operations may be substantially different than today. Examples include:

1. Greater information overload
2. Fusion of strategic/operational/tactical domains
3. Highly ambiguous situations; dynamic change
4. Information warfare
5. Increased complexity
6. Increased pace of operations
7. Increased tactical, operational, and strategic speed
8. Planning and operating in the surface-to-space continuum

Individuals. We anticipate that soldiers will require more experience than has been required for success in the past, therefore, they will be older and required to serve longer for a career. Additionally, the pace of operations and the merging of strategic, operational, and tactical implications during operations will, in a very real sense, provide less room for human failure. We may find that near flawless execution is required. Accomplishing that in a culture that allows for mistakes for the purpose of learning may be a significant leadership challenge we will have to address.

²⁷ Strike Force Home Page, quoting General Reimer. Internet article found on 22 February 1999 at <http://www-tradoc.monroe.army.mil/pao/info.htm>. Strike Force experiments are complimentary to development efforts of other military services, Zanini said. It will not replace Marine Corps assault forces, which "is the best over-the-shore forced entry capability ... anywhere in the world. "We can't go do this without the (Air Force) Air Expeditionary Force," Zanini said. He also said the reach-back concept was borrowed from the Air Force.

²⁸ Department of the Army, Army Regulation 140-1, *The Army Reserve: Mission, Organization and Training* (Washington DC: US DA, 1 September 1994). Found at internet article (<http://www.army.mil/usar/default.htm>). Five basic missions:

1. Provide trained and ready units to rapidly mobilize and deploy in seamless power projection force packages.
2. Provide trained and ready individual soldiers to augment and reinforce the Army
3. Provide personnel service support for Army retirees and veterans from the active Army, Army Reserve, and National Guard.

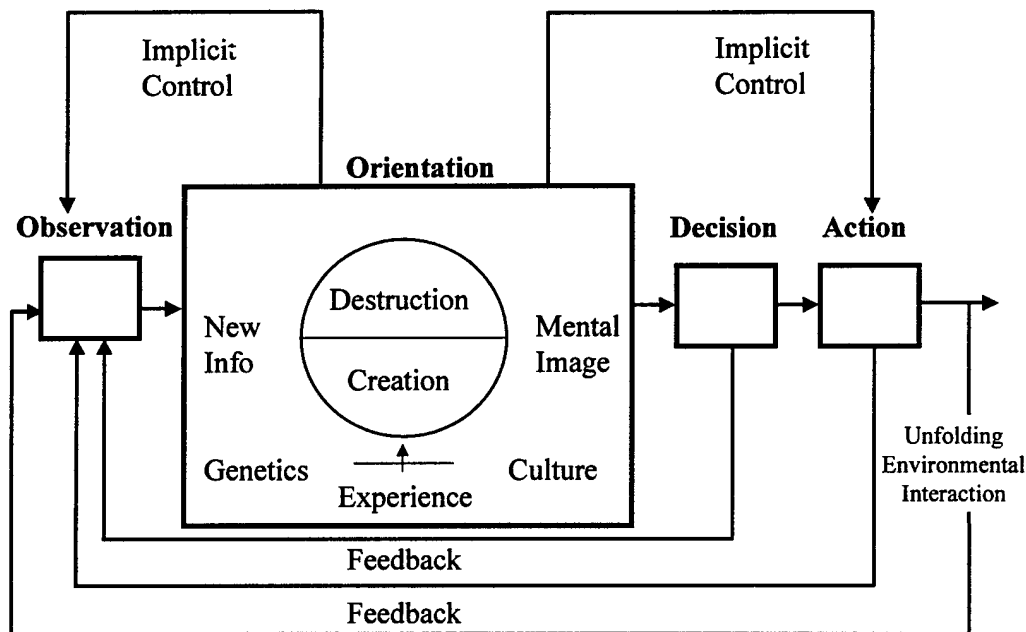
4. Provide land force power projection enablers.
5. Provide a capability to reconstitute the Army.

The Army Reserve is a part of the Total Force Policy as implemented by then Army Chief of Staff Creighton Abrams.

²⁹ Edgar H. Schein, *Organizational Culture and Leadership, Second Edition* (San Francisco, California: Jossey-Bass, 1992). Richard L. Daft, *Organizational Theory and Design, Fourth Edition* (St. Paul, Minnesota: West Publishing Company, 1992). J. Steven Ott, *The Organizational Culture Perspective* (Pacific Grove, California: Brooks/Cole Publishing Company, 1989).

³⁰ William S. Lind, *Maneuver Warfare Handbook* (Boulder: Westview Press, 1985), 5-8. Boyd's Observe, Orient, Decide, Act Loop

Boyd's OODA Loop



³¹ Joint Chiefs of Staff, OC Incorporated, software developers, Joint Electronic Library, CD-ROM (Washington D.C.: U.S. Government Printing Office, 1998), "JEL Encyclopedia," 222-225.

³² Operational and Organizational Concept paper unsigned, January 1999.

³³ Operational and Organizational Concept paper unsigned, November 1998.

³⁴ "Reimer unveils Strike Force at AUSA symposium," AUSA News, Volume 21, Number 6, April 1999, 3. Also appeared conceptually in Strike Force Operational and Organizational concept papers and briefings, dated December 1998 through March 1999. Operational and Organizational Concept paper undated and unsigned. Internet article found on 22 February 1999 at <http://www-tradoc.monroe.army.mil/pao/info.htm>.

³⁵ Carl von Clausewitz, *On War*, trans. and ed. Michael Howard and Peter Paret (Princeton, New Jersey: Princeton University Press, 1984), 101. "Consequently, it would be an obvious fallacy to image war between civilized peoples as resulting merely from a rational act on the part of their governments and to conceive of war as gradually ridding itself of passion, so that in the end one would never really need to use the physical impact of fighting forces – comparative figures of their strength would be enough."

³⁶ Martin van Creveld, *Command in War* (Cambridge, Massachusetts: Harvard University Press, 1985), 9-10.

³⁷ van Creveld, 232-260.

³⁸ FM22-100, *Army Leadership*, January 1999.

³⁹ Porter B. Williamson, *Patton's Principles: A Handbook for Manager's Who Mean It!* (New York: Simon and Schuster, 1979), 136-139. Paraphrased this section could read, "The effective characteristics of a leader are probably best measured not by not what you do on the top, but how far you bounce back when you are on the bottom."

⁴⁰ Dennis J. Reimer, "The Annual Report on the Army After Next Project, July 1997," (Department of the Army, Office of the Chief of Staff, 1 August 1997): 23.

⁴¹ James J. Schneider, "Black Lights: Chaos, Complexity and the Promise of Information Warfare," in *Foundations of Military Theory Course 1 Syllabus* (U.S. Department of the Army, Command and General Staff College, School of Advanced Military Studies, Fort Leavenworth, Kansas, 10 May 1998). Additionally the concept of the empty battlefield appeared in another article by Dr. Schneider, "Cybershock: Cybernetic Paralysis as a New Form of Warfare," in *Foundations of Military Theory Course 1 Syllabus* (U.S. Department of the Army, Command and General Staff College, School of Advanced Military Studies, Fort Leavenworth, Kansas, 10 May 1998).

⁴² *Random House College Dictionary, Revised Edition*, ed. Jess Stein (New York: Random House, 1980), 1232.

⁴³ R.J. Sternberg, *Successful Intelligence* (New York: Simon and Schuster, 1996), 155, 321, 323.

⁴⁴ TRADOC Pamphlet 525-5, 2-8. The document noted that "New communication systems will allow nonhierarchical dissemination of intelligence, targeting, and other data at all levels. The new way of managing forces will alter, if not replace, traditional, hierarchical command structures with internettted designs...." Because this internettted structure can diffuse command authority, new leadership and command structures will be required in many militaries."

⁴⁵ Department of the Army, Headquarters, Field Manual 101-5, *Staff Organizations and Operations* (Washington, D.C.: June 1997). 5-1.

⁴⁶ Jeanette A. Lawrence, "Expertise on the Bench: Modeling Magistrates' Judicial Decision Making," In *The Nature of Expertise*, eds. Michelene T.H Chi, Robert Glaser and Marshall Farr (Hillsdale, NJ: Lawrence Erlbaum Associates, 1988), 229, 256-7.

⁴⁷ Clausewitz, 76.

⁴⁸ Israel Mayk and Izhak Rubin, "Paradigms for Understanding C3, Anyone?" In *Science of Command and Control: Coping with Uncertainty*, eds. Stuart E. Johnson and Alexander H. Levis (Washington, D.C.: National Defense University, AFCEs International Press, 1988), 52-7.

⁴⁹ Ibid., 52-7.

⁵⁰ Chester F. Dymek, "Developing Situational Understanding: Will a Digitized Force See the 21st Century Forest Through the Trees?" (First Term Monograph, School of Advanced Military Studies, Fort Leavenworth, Kansas, 1999), Decision Making Annex. Individual decision making may be reduced to simply a matter of acquiring information, assessing the stimulus or data, and then acting. The following is a description of some characteristics of the model that may not be clear from observation. There appears to be an element of the decision making process that some authors omit; the non-decision or no decision. Refusal, delay, or inattention are decisions not to decide. Refusal is the choice for the status quo, deny all possible offered alternatives and do nothing. A delay could be for any number of potential reasons: inspecting further alternatives; acquiring more data; evaluating all possible alternatives and outcomes; or just waiting for your answer that is currently unavailable. Inattention borders on incompetence, but it could be either allowing someone else decide or a failure to perceive an occasion for choice. Time is an essential element within the context of military decision making and the phenomenon of indecision. There exists an optimal time to make a decision based on information available and the ability of an individual to decide. The time is optimal either because obtaining additional information is impractical or impossible. Colloquially, some members of the military may refer to this time as "the good idea cutoff point." This is a point in time when a decision must be made and action taken regardless of the arrival of new information. Sometimes this cutoff point causes a

decision not to be made. In the beginning of the decision making process a cutoff point may be made to deal with ambiguity and define the problem or situation. In the middle stages of the cycle a cutoff point may be made to deal with uncertainty in the context. In the final stages of the decision making process a cutoff point may be made to deal with unacceptability, minimum criteria for success.

⁵¹ Herbert S. Kindler, *Risk Taking: A Guide for Decision Makers* (Menlo Park, CA: Crisp Publications, 1990).

⁵² Harry L. Van Trees, "C3 Systems Research: A Decade of Progress," In *Science of Command and Control: Coping with Complexity, Part II*, eds. Stuart E. Johnson and Alexander H. Levis (Washington, D.C.: National Defense University, AFCES International Press, 1989), 36. Clausewitz, 75-89, 100-112.

⁵³ Gary A. Klein, "Naturalistic Models of C3 Decision Making," In *Science of Command and Control: Coping with Uncertainty*, eds. Stuart E. Johnson and Alexander H. Levis (Washington, D.C.: National Defense University, AFCES International Press, 1988), 86. He studied ways to elicit knowledge and apply data for training, decision support systems, and expert systems.

⁵⁴ Ibid., 86-7. Klein's research studied fire ground commanders (fire station leaders and fire truck team chiefs) who averaged twenty-three years experience. Given the inherent dangers of fire fighting, the selfless nature of saving other human beings, and the level of responsibility of the subjects, Klein's research presents a cogent argument for military decision making. He tested a possible 156 decision points using the interview technique to examine reactions to both critical and nonroutine incidents. No commander selected a predefined option in any of the scenarios. Specifically, within the nonroutine incidents, only twenty percent reported any attempt to deliberate between options.

⁵⁵ Ibid., 87.

⁵⁶ Ibid., 88. Klein cited the work of Howell, 1984; Zakay and Wooler, 1984; and Rouse, 1979.

⁵⁷ Richard W. Paul, *Critical Thinking: How to Prepare Students for a Rapidly Changing World* (Santa Rosa, California: Foundation for Critical Thinking, 1995), vi.

⁵⁸ Ibid., 27.

⁵⁹ Dennis K. Leedom and Jon Fallesen, "Initial Insights From Prairie Warrior 98: Cognitive Engineering of the Digital Battlefield" (Fort Leavenworth, Kansas: U.S. Army Research Laboratory, 3 September 1998), 2, 4, 6.

⁶⁰ Rex Michel, "Measuring Battlefield Knowledge Structures: Test of a Protocol Analysis Approach" (Fort Leavenworth, Kansas: U.S. Army Research Institute for the Behavioral and Social Sciences, June 1998), 2. Dr. Michel summarized the work of the following publications: Glaser, 1984; Ceci and Ruiz, 1992; Royer, Cisero, and Carlo, 1993; Federico, 1995 in arriving at his assessment.

⁶¹ Hubert L. Dreyfus and Stuart E. Dreyfus, *Mind Over Machine: The Power of Human Intuition and Expertise in the Era of the Computer* (New York: Macmillan, Inc., 1986), 19.

⁶² Ibid., 16-51.

⁶³ Michelene T.H. Chi, Robert Glaser and Marshall Farr, eds., *The Nature of Expertise* (Hillsdale, NJ: Lawrence Erlbaum Associates, 1988), 36.

⁶⁴ Michel, 2. Dr. Michel summarized the work of the following publications: Wiser and Carey, 1983; Scribner, 1986; Lawrence, 1988; Johnson-Laird, 1989; Van Lehn, 1989 in determining his assessment.

⁶⁵ Chi, Glaser, and Farr, xv.

⁶⁶ Ibid., xvii through xx. See Annex C, Decision Making Experimental Research Data and Summaries, for a complete listing of their observations for each of the seven findings.

⁶⁷ Andrea A. diSessa, "Phenomenology and the Evolution of Intuition," In *Mental Models*, eds. Dedre Gentner and Albert L. Stevens (Hillsdale, NJ: Lawrence Erlbaum Associates, 1983), 32-3.

⁶⁸ Elliot Soloway, Beth Adelson, and Kate Ehrlich, "Knowledge and Processes in the Comprehension of Computer Programs," In *The Nature of Expertise*, eds. Michelene T.H. Chi, Robert Glaser and Marshall Farr (Hillsdale, NJ: Lawrence Erlbaum Associates, 1988), 130.

⁶⁹ Chi, Glaser, and Farr, xxxiv.

⁷⁰ Ibid., xxxiv.

⁷¹ James J. Straszewski, "Skilled Memory and Expert Mental Calculation," In *The Nature of Expertise*, eds. Michelene T.H. Chi, Robert Glaser and Marshall Farr (Hillsdale, NJ: Lawrence Erlbaum Associates, 1988), 76-77. Experts exploit long term memory to expand working memory capacity in terms of three principles of skilled memory:

(1) The mnemonic encoding principle (this principle states that experts encode new information in terms of an existing knowledge base, thus exploiting information in LTM as a mnemonic aid);

(2) The retrieval structure principle (this principle asserts that experts use their knowledge of a domain to develop abstract, highly specialized mechanisms for systematically encoding and retrieving meaningful patterns in LTM);

(3) The speed up principle (This principle states that practice increases the speed (and reliability) with which experts (a) recognize and encode meaningful patterns and (b) store and retrieve information using retrieval structures). Also seen in Rex Michael's report, "To sum it up, it appears that expert mental calculators use semantic memory in three principal ways to achieve fast and accurate performance. First, consistent with skilled memory theory's mnemonic encoding principle, they use an elaborately interrelated knowledge base to recognize and encode meaningful patterns of numbers that occur either as problems or embedded sub-problems, thus promoting their retention. Second, much like chess-masters apparently use their pattern recognition capabilities to efficiently select chess moves, calculation experts use their unique pattern recognition capabilities to effectively select efficient computational strategies on a problem-by-problem basis. Finally, experts use their knowledge to replace computation with retrieval as a means of generating products and intermediate results, thereby decreasing solution times.

⁷² Ibid., 81.

⁷³ Michael I. Posner, "What is it to be an expert?" In *The Nature of Expertise*, eds. Michelene T.H Chi, Robert Glaser and Marshall Farr (Hillsdale, NJ: Lawrence Erlbaum Associates, 1988), xxi.

⁷⁴ Eric J. Johnson, "Expertise and Decision under Uncertainty: Performance and Process," In *The Nature of Expertise*, eds. Michelene T.H Chi, Robert Glaser and Marshall Farr (Hillsdale, NJ: Lawrence Erlbaum Associates, 1988), 209, 212.

⁷⁵ Straszewski, 113. Michel, 2-3.

⁷⁶ Michel, 3. Experts have a distinct advantage over the novice when the routine tasks require no time for thought. They use their memory to aid in the decision making. "Experts use retrieval structures effectively because they have learned the processing demands of a task and which information is essential for successful performance." The advantage is in knowing the steps of problem identification: clearly identifying the difficult versus the easy, the complex versus the routine. The novice lacks the experience within the domain to do it.

⁷⁷ Joseph A. Horvath, Yale University, George B. Forsythe, Patrick J. Sweeney, Jeffrey A. McNally, and John Wattendorf, US Military Academy. Wendy M. Williams

and Robert J. Sternberg, Yale University, Technical Report 1018, *Tacit Knowledge in Military Leadership: Evidence from Officer Interviews* (United States Army Research Institute for the Behavioral and Social Sciences, October 1994), 7-8.

⁷⁸ Ibid., 8.

⁷⁹ Ross R. Vickers, Report Number 95-16, *Using Personality Assessment for Leadership Selection* (Naval Health Research Center, San Diego, CA), 3.

⁸⁰ Peter J. Martin, "Leader Competencies: Implications for Force XXI. FY 95 Mobile Strike Force Battle Command Experiment," (TRADOC Analysis Center, Fort Leavenworth, Kansas, June 1995).

⁸¹ Michael Mumford, Stephen J. Zaccaro, Francis Harding, Edwin A. Fleishman, and Roni Reiter-Palmon, Technical Report 977, "Cognitive and Temperament Predictors of Executive Ability: Principles for Developing Leadership Capacity," (US Army Research Institute for the Behavioral Sciences, Management Research Institute, May 1993), vii-viii. "Specifically, 65 cognitive and temperament predictors of executive ability were organized into eleven dimensions: general cognitive intelligence, creativity, crystallized cognitive skills, adaptability/ego resiliency, openness/curiosity, self-awareness, achievement, need for dominance, commitment to social systems, practical intelligence, and social intelligence."

⁸² Stein, 420.

⁸³ Ernest T. Pascarella and Patrick T. Terenzini, *How College Affects Students: Findings and Insights from Twenty Years of Research* (Jossey Bass: San Francisco, CA, 1991), 62-113, 636-656.

⁸⁴ Ibid., 62-113, 636-656.

⁸⁵ Ibid., 114-161, 636-656.

⁸⁶ LTG Montgomery C. Meigs and COL Edward J. Fitzgerald, III, "University After Next," *Military Review*, 78(2), (March-April 1998): 39-45.

⁸⁷ Pascarella and Terenzini, 89, 91, 93. Anderson (1987) reported findings that indicated females performed better than males in problem analysis and algorithmic application when the problems were expressed verbally rather than mathematically. From his research on computer based instruction and problem solving he concluded that studies of "science decision making" imply that women are better than men at tasks defined as systems analysis rather than program coding. However, women's strength in

analytical reasoning are a liability in developing the intuitive skills of an expert, such as chess grand master.

⁸⁸ John Adair, *Training for Decisions* (London: MacDonald and Company, 1971), 121-123.

⁸⁹ Adair, 90, 109, 125-140. Martin van Creveld, *The Training of Officers: From Military Professionalism to Irrelevance* (The Free Press, Macmillan, Inc. New York, 1990), 105-109. Frederic Brown, *The U.S. Army in Transition II: Landpower in the Information Age* (Washington, D.C.: Brassey's Incorporated, 1993), 117-118.

⁹⁰ Ibid., 114-161, 636-656.

⁹¹ Karol G. Ross, "Filling the Theoretical Gap in Battle Staff Training: A Constructivist Paradigm" (US Army Research Laboratory, Fort Sill, OK, 1999), 1-7.

⁹² Ibid., 2-3. Also appeared in "Revitalizing Battle Staff Training," a draft article by Karol G. Ross, Linda G. Pierce, COL Peter S. Corpac (US Army Research Laboratory, Fort Sill, Oklahoma, 1999), 2.

⁹³ Stein, 1393.

⁹⁴ Although not as well-known as Piaget's Cognitive Developmental Theory, or Freud's Psychoanalytic Theory, Austrian Heinz Werner's contribution of what is known as the orthogenic principle more completely describes the "how" and not merely the "what" of development. Werner's Organismic and Comparative Theory also offers a dialectic thought process based on his orthogenic principle, that development occurs from a state of relative lack of differentiation, to a state of increasing differentiation and hierarchic integration. Werner's work directly influenced two theorists who have focused their efforts on the intellectual development of college students, Arthur W. Chickering and William G. Perry, Jr. The study of college and graduate student development closely aligns with intellectual development within the profession of arms because generally the institutional purpose and goal of both groups is to develop a sense of individual and collective identity, foster life and career experience, while training and educating within a specific field.

Chickering, a Distinguished Professor of Higher Education at the University of Memphis, contributed the theory that an individual develops an identity through achieving competency, finding a purpose, and mastering thought processes. Chickering described seven vectors of change that identify how, through structured educational experience, an institution or organization can foster the higher professional, social and cognitive processes of development. Perry, a Harvard University professor, studied the linkages between moral and intellectual development. Perry argued that intellectual development takes place in the building of commitment to value sets and the forms in

which an individual processes information about the world. His fundamental belief was that, to understand how someone thinks, you must first get them to think. Perry's contribution to developmental theory was a scheme for evaluating the analytic thought structure of college age students. His stages of development centered on the self-prospective from the basic duality of a black and white world to one of commitment to a complex hierarchical value set.

⁹⁵ Harriet Tyson Bernstein, authored an article, "A conspiracy of good intentions" in E.D. Hirsch, Jr's *The Schools We Need: And Why We Don't Have Them* (New York: Doubleday, 1996). She used the phrase "orthodoxy masquerading as reform," on page 15 to describe her views of our public educational system. I thought it equally applied to the military education system through the CGSOC.

⁹⁶ SLA Marshall, in his book, *Sinai Victory* (Nashville: The Battery Press, 1985) detailed the Israeli shift in their training program to develop initiative on the battlefield and quick thinking in reserve officers. Within the context of the 100 hour 1956 Israeli-Egyptian Sinai War, Marshall explored many reasons for the Israeli success and Egyptian failure. Following the war, the Israelis developed an exercise that appeared very similar in theory to a BCPT or Warfighter, but executed in the field as a command post exercise (CPX). In the three day CPX, a battalion commander and staff are given a standard tactical exercise, such as capture a defended town, attack a hill, or seize a bridge. The first day of the exercise the commander has maps, aerial photographs, and time to conduct reconnaissance -- everything needed to make a decision in 22 hours of planning time. He has time to develop orders and gain information from subordinate commanders without any external requirements from higher headquarters. As soon as he delivers the order to the battalion, he gets a change in mission from his higher headquarters. The time of execution (H-hour) has changed and the brigade must now go to a new objective in an area other than what was originally planned, for example the hill on the right. He has maps and photos, but no time for reconnaissance and has 30 minutes before SP. The subordinate commanders begin to give status reports and right before he issues the order to move, a flash spot report comes in. The situation changes dramatically. The battalion lost half of its combat force. The enemy penetrated the defensive line on the left. The unit must now attack straight into a hill that is to its direct front. No time to check any staff reports or a map, the higher commander wants a decision now! These exercises clearly identified those commanders and staffs that were prepared and trained, 249-253.

⁹⁷ van Creveld, *The Training of Officers: From Military Professionalism to Irrelevance*, 105-109.

⁹⁸ The idea for this sentence came from watching "Mr. Holland's Opus," a 1995 film directed by Steven Herek. In a scene near the end of the film, Olympia Dukakis tells Richard Dreyfus that the true purpose of education is to not only teach facts, but also develop a thought process that provides "a compass" for the students.

Annex A Glossary

Accomodation: In the cognitive thought process if a concept or object does not fit into our existing cognitive structure, we make changes to our thought structure.

Assimilation: In the cognitive thought process it means the taking in, digesting; in the intellectual sphere we have a need to assimilate objects or information into our cognitive structures.

Battle Command: the art of decision making, leading, and motivating soldiers and their organizations into action to accomplish missions: includes visualizing current state and future state, then formulating concepts of operations to get from one to another at least cost; also includes assigning missions, prioritizing and allocating resources, selecting the critical time and place to act, and knowing how and when to make adjustments during the fight.

Battle Dynamics: five major interrelated dynamics that define significant areas of change from current operations to Force XXI Operations; dynamics are battle command, battlespace, depth and simultaneous attack, early entry, and combat service support.

Battlespace: components of this space are determined by the maximum capabilities of friendly and enemy forces to acquire and dominate each other by fires and maneuver and in the electromagnetic spectrum.

Cognitive Task Analysis: Bloom's taxonomy consists of six cognitive levels for learning objectives ranging from those requiring the most concrete to the most complex cognitive behaviors on the part of the student. The six cognitive levels are:

- Knowledge – Recognition, familiarity, recall.
- Comprehension – Translation, interpretation, extrapolation.
- Application – Use of concepts in new situations. Ability to predict effects based on general principles.
- Analysis – Identification of known general principles within a given setting. Check hypotheses against information and assumptions.
- Synthesis – Development of a plan or communication that conveys experience and ideas to others. Ability to make discoveries and generalizations across settings.
- Evaluation – To make quantitative and qualitative judgments. Compare theories or generalizations.

Cognitive psychology applies to the study of thinking, concept formation, and problem solving. Work in this field has been much influenced and aided by the use of computers. Computers are used to present problems and tasks to subjects and to model the thinking

and problem-solving processes. The impact of computers on cognitive psychology is also evident in the theories used to describe human thought.

Complexity: Detail complexity contains many variables in a static environment. Dynamic complexity has subtle cause and effect relationships where the affect of interventions over time is not obvious. Senge indicated that the real leverage in most management situations lies in understanding dynamic complexity, not detail complexity.

Coup D'oeil: Baron Antoine Jomini's Art of War discussed the importance of tactics, terrain, logistics, combined arms, courage, policy, and strategy. Jomini's contribution however is not that the general should have a systematic technical knowledge, but rather the ability to **know when to do what first**. That recognized ability and insight of the great captains, *coup d'oeil* as Frederick wrote, was of the tactical thought process, not an application of approved solutions. Clausewitz expanded the concept of *coup d'oeil* as the genius to deal with the uncertainties of war and the strategic inward eye. Although we have become a system of systems, the most important system remains the human brain. Technology may liberate leaders to make decisions, but it may also debilitate the decision making process.

Creativity: Creativity may be defined as "novel ideas that transcend generative rules"(Margaret A. Bodan, *The Creative Mind: Myths & Mechanisms*. New York: Basic Books, 1991, 111). "The power of the human mind to create new content -- transferring relations and thereby generating new correlates -- extends its sphere not only to the representation in ideas, but also to fully sensuous presentations"(C. Spearman, *Creative Mind*, (New York: D. Appleton, 1931, 148), quoted in J.W. Getzels and Irving A. Taylor, *Perspectives in Creativity*, (Chicago: Aldine Publishing Company 1975, 2). "Forming associative elements into new combinations which either meet specified requirements or are in some way useful" (S.A. Mednick, *The Associative Basis of the Creative Process*, *Psychological Review*, 96 (1962): 221, also quoted in Getzels and Taylor, 11). Morris Stein, "that process which results in a novel work that is accepted as tenable or useful or satisfying to a group at some point in time." (M.I. Stein, *A Transactional Approach to Creativity*, in C.W. Taylor ed., *The 1955 University of Utah Research Conference on the Identification of Creative Scientific Talent* (Salt Lake City: University of Utah Press, 1956, 172), quoted in Getzels and Taylor, 3).

Deductive and inductive reasoning: Deductive and inductive refer to two distinct logical processes. Deductive reasoning is a logical process in which a conclusion drawn from a set of premises contains no more information than the premises taken collectively. The truth of the conclusion is dependent only on the method and is logically true even if the premise is absurd. Inductive reasoning is a logical process in which a conclusion is proposed that contains more information than the observation or experience on which it is based. The truth of the conclusion is verifiable only in terms of future experience and certainty is attainable only if all possible instances have been examined.

Depth and Simultaneous Attack: the simultaneous application of combat power against an enemy throughout the depth and breadth of the battlefield; objective goes beyond defeating the enemy; objective is to accelerate enemy defeat

Development: Understanding that no one perspective is capable of explaining or defining everything, I will integrate a number of theories and definitions. Development is a hierarchical process, in which each step is seen as a confrontational challenge to a person's previous state that requires extension (differentiation and integration) and redefinition (assimilation and accommodation) of individual attitudes or competencies in the midst of increasing uncertainty and complexity to again achieve a balance (equilibration and the orthogenic principle).

Dialectical Theory: Any theory that holds that change occurs when our ideas meet with counter-evidence that motivates us to formulate new and better ideas.

Differentiation: Occurs when a global whole separates into parts with different forms or functions.

Direct Leadership: The face to face, first line leadership is direct. It takes place in organizations where subordinates are used to seeing the leaders all the time: teams, squads, sections, platoons, companies, batteries, troops, even squadrons and battalions. The direct leaders span of influence, those lives he can reach out and touch, may range from a handful to several hundred people.

Distributed Operations: Employing our emerging capabilities, operations and functions are executed throughout the depth, width and height of our battlespace. These operations are distributed, that is executed where and when required to achieve decisive effects vice concentrated at a possibly decisive point. Key to distributed operations is the empowerment of soldiers and leaders to use their initiative, willpower, and professional expertise to carry out critical tasks at all echelons. Distribution enables Army elements to take advantage of internetworked communications avoiding the tendency to use the chain of command as the chain of information. Dispersion empowers subordinates to operate independently within the commander's intent, leading to synergistic effects that exceed synchronization by a centralized headquarters. Distributed operations lead to agility, with greater flexibility to react to multiple changes in the situation. There are certain functions that are best executed centrally, primarily management of resources. Force XXI Operations seek to execute each function using the best operational scheme. Through experimentation and operational experience, it appears the best approach is: develop a central intent and concept; conduct parallel planning and coordination enabled by digitization; and execute distributed operations to achieve the objective.

Empty Battlefield: describes the perception that a soldier is virtually alone on the battlefield; describes the changed appearance of the battlefield when soldiers begin dispersing and seeking cover in response to increasing lethality of weapon systems.

Equilibration: Is the conflict resolution between experiences that contradict the original thought structure and thus promote cognitive development (Piaget).

Five Stages of Skill Acquisition; a development hierarchy

Skill Level	Components	Perspective	Decision	Commitment
1. Novice	Context-free	None	Analytical	Detached
2. Advanced Beginner	Context-free and situational	None	Analytical	Detached
3. Competent	Context-free and situational	Chosen	Analytical	Detached understanding and deciding. Involved in outcome.
4. Proficient	Context-free and situational	Experienced	Analytical	Involved understanding. Detached deciding.
5. Expert	Context-free and situational	Experienced	Intuitive	Involved

Novice: The novice learns to recognize various objective facts and features relevant to the skill and acquires rules for determining actions based upon those facts and features. Elements of the situation to be treated as relevant are so clearly and objectively defined for the novice that they can be recognized without reference to the overall situation in which they occur (context free). Lacking the sense for the overall task, a novice depends upon learned rules to act. After the acquisition and application of more than just a few rules, the exercise of the skill requires so much concentration that the novice's capacity to talk or listen to advice is extremely limited.

Advanced Beginner: After the novice has considerable experience in coping with real situations, performance improves to an acceptable level. While that encourages the learner to consider more context-free facts and to use more sophisticated rules, it also teaches him a more important lesson involving an enlarged conception of the world of skill. Through the perceived similarity with prior examples, the advanced beginner starts to recognize meaningful elements when they are present. Experience seems immeasurably more important than any form of verbal description.

Competent: With more experience, the number of recognizable context-free and situational elements present in a real-world circumstance eventually become overwhelming. A sense of what is important is missing. To cope with the problem, people learn, or are taught, to adopt a hierarchical procedure of decision-making. First by choosing a plan to organize the situation, and then by examining only a small set of factors that are most important given the chosen plan, a person can both simplify and enhance his performance. The difference here is the competent performer chooses an organization plan, feels a responsibility for the choice and the results, and is involved in what occurs thereafter. These are internalized lessons, not easily forgotten.

Proficient: The two highest levels of skill, are characterized by a rapid, fluid, involved kind of behavior that bears no apparent similarity to the slow, detached reasoning of the problem-solving process. The proficient performer is deeply involved in the task and will be experiencing it from some specific perspective because of recent events. He has the ability to intuitively respond to patterns without decomposing them into component feature, a sense of "holistic discrimination and association." Intuition or know-how is neither wild guessing nor supernatural inspiration, but the sort of ability we all use all the time as we go about our everyday tasks. The proficient performer, while intuitively organizing and understanding his task, will still find himself thinking analytically about what to do. Elements that present themselves as important, thanks to the performers experience, will be assessed and combined by rule to produced decisions about how to best manipulate the environment.

Expert: An expert generally knows what to do based on mature and practiced understanding. When deeply involved in coping with his environment, he does not see problems in some detached way and work at solving them, nor does he worry about the future and devise plans. An expert's skill "has become so much a part of him that he need be no more aware of it than he is his own body." After enough experience within a specific domain, memory is modified, codified and organized in such a manner that there is no need to decompose the patterns, but seen in an instant as the holistic picture. Experts performance may be seen as ongoing and non-reflective, but given time and when the outcomes are crucial, an expert will deliberate before acting. The deliberation may not require analytic problem solving, but rather critically reflecting on one's intuitions. An ability to discriminate an immense number of situations is produced by experience. "With enough experience in a variety of situations, all seen from the same perspective or with the same goal in mind but requiring different tactical decisions, the mind of the proficient performer seems to group together situations sharing not only the same goal or perspective but also the same decision, action, or tactic." At this point not only is a situation, when seen as similar to a prior one, understood, but the associated decision, action, or tactic simultaneously comes to mind.

Force Projection: the movement of military forces from CONUS or a theater in response to requirements of war or operations other than war; force-projection operations extend from mobilization and deployment of forces, to redeployment to CONUS or home theater, to subsequent demobilization

Full-Dimensional Operations: the application of all capabilities available to an Army commander to accomplish his mission decisively and at the least cost across the full range of possible operations

Information Age: the future time period when social, cultural, and economic patterns will reflect the decentralized, nonhierarchical flow of information; contrast this to the more centralized, hierarchical social, cultural, and economic patterns that reflect the Industrial Age's mechanization of production systems.

Information Operations: continuous combined arms operations that enable, enhance, and protect the commander's decision cycle and execution while influencing an opponent's; operations are accomplished through effective intelligence, command and control, and command and control warfare operations, supported by all available friendly information systems; battle command information operations are conducted across the full range of military operations.

Information Warfare: actions taken to preserve the integrity of one's own information system from exploitation, to corrupt or destroy an adversary's information system, and, in the process, to achieve an information advantage in the application of force.

Integration: (Cognitive Psychology) Coordinating and organizing thoughts into a whole

Integration: Force XXI Operations are fully integrated with Joint, Multi-national, and Non-governmental partners. Recent experience has reminded us that Army operations have never been and will never be independent. From initial receipt of mission, through deployment, operations, and transition to follow-on operations Army elements function as an integral part of a Joint Task Force. That Joint Task Force is linked to Coalition partners and usually operates in conjunction with one or more non-governmental agencies such as the International Red Cross, United Nations, etc. Integrated operations enable the Army to leverage the full suite of capabilities the services bring to the battlespace. Army helicopters operating from Navy aircraft carriers during Operation RESTORE DEMOCRACY and TMD warnings from SPACECOM are two examples of fully integrated operations.

Military Decision Making Process: A single, established, and proven analytical process. The MDMP is an adaptation of the Army's analytical approach to problem solving. It is time consuming, but focuses on detailed integration, synchronization, and coordination.

Multi-Dimensional: Force XXI will operate in an expanded battlespace. This battlespace goes beyond the traditional physical dimensions of width, depth and height. It includes portions of the electro-magnetic spectrum. This extends beyond the physical boundaries of the division through its communications and digital connectivity to other Army, Joint and Coalition elements, even reaching back to CONUS from the Theater of Operations. Battlespace will also be defined by the human dimension; this includes not

only soldiers and leaders, but also the civilian population in which operations are being conducted, citizens and families in the United States, and the peoples of the world. Finally, time is a dimension of battlespace that must be mastered. This concept seeks to seize and exploit the initiative to set the tempo of a battle, not just acting faster than the enemy, but acting at that speed which is best for execution of the friendly plan. Battlespace will generally be framed by METT-T and largely shaped by corps or JTF operations. This shaping includes not only the application of fires and combat power, but also deception, PSYOPS, civil affairs, host nation support, sustainment, intelligence, and reinforcement of existing terrain and infrastructure.

Non-Linear: Force XXI Operations are characterized by non-linearity, executing tasks across the entire battlespace rather than massing combat power at the Forward Line of Troops (FLOT). Non-linear operations do not seek a rigid organization of the battlespace into close, deep, and rear operations. Instead, the battlespace is fluid, changing as METT-T changes through the duration of mission preparation and execution. Peacetime engagement, humanitarian assistance, and peacekeeping missions are generally executed non-linearly, conforming to the physical characteristics or infrastructure of the area of operations or based on mission requirements. Non-linearity requires soldiers and leaders to possess greater situational awareness, allowing risk to be accepted with space between units rather than more traditional contiguous operations. Non-linearity also increases the requirement of each divisional element, maneuver, CS and CSS for all-around security.

Organizational Leadership: Leaders at the organizational level influence several hundred to several thousand people. They do this indirectly, generally through more levels of leadership than direct leaders. Organizational leaders have staffs to help them lead their people and manage their organizations' resources. The skill domains are the same as the direct leader, but organizational leaders deal with inherently more complexity, more people, greater uncertainty, and a greater number of unintended consequences. Organizational leaders include military leaders at the brigade through the corps levels.

Orthogenic principle: Whenever development occurs, it proceeds from a state of relative lack of differentiation to a state of increasing differentiation and hierarchic integration (Heinz Werner's view of development). Werner's comparative theory focused on the notion of *Gestalt*, in that we tend to close or complete figures into whole patterns.

Precise: Force XXI Operations are characterized by synchronized attacks throughout the battlespace on units and targets which have been subjected earlier, condition setting attacks, to enhance their vulnerability. Such decisive operations require great precision. Precision in decisive operations is enabled by three emerging capabilities. First digitization, providing soldiers and leaders at each echelon the information required for making informed decisions. Second, a full suite of strategic, operational, and tactical sensors, linked to analytical teams will fuse combat information into situational awareness across the battlespace with greater clarity than ever before. Lastly, simulations enable Army elements to be tailored based on emerging situation/crisis, plan operations

based on METT-T, wargame and rehearse those operations yielding precision in execution. Precision in operations goes beyond precision strike; it includes every aspect of military operations from deployment through combat and redeployment or transition to other operations. In force projection this means the right force, effectively trained and rehearsed, to the right place on time. In combat operations, precision means precise maneuver, positioning elements correctly in time and space, complemented by precision systems and precision munitions and setting conditions which minimize the enemies' ability to rapidly respond and desynchronize our capabilities. Precision in force protection includes employing dynamic obstacles synchronized in time and space which create either protective or shaping effects; additionally air/missile defenses must be effectively employed to counter each enemy capability based on intelligence at each echelon. Precision in sustainment includes proactive arming, fueling, fixing, and manning empowered by common situational awareness of requirements and asset availability.

Relevant Common Picture: Is a digital, near-real time representation of the location of friendly and enemy units. The enhanced communications abilities and technologies allow the creation of a common operational picture, which is the near simultaneous sharing of the operational picture. This common data operational picture means something to everyone who looks at it. The set of human perceptions extrapolated from the operational picture results in situational awareness.

Simultaneity: The concept of decentralized operations that is multi-dimensional, precise, distributed, and non-linear yields the capability to conduct simultaneous operations across the battlespace. Simultaneous operations seize the initiative and present the enemy leadership with multiple crisis, but no effective response. Digitization creates the ability to plan, coordinate, and execute actions simultaneously. Each of these actions creates an effect, the sum of which is greater than if they were discrete and sequential. Rather than a single concentrated attack, we execute a series of attacks (lethal and non-lethal) as near-simultaneously as possible. For distributed operations to have decisive effect upon the adversary, they must be conducted at a tempo and sequence that he cannot endure. The principle of simultaneity of action is paramount to the success of Decisive Operations. Commanders determine critical objectives and sequence of actions to overwhelm the adversary's combat and support structures in a near-simultaneous manner to cause rapid defeat or collapse. Upon indication of collapse, highly mobile forces exploit by fires and maneuver to gain control and dominate the contested battlespace.

Situational Awareness: The ability to have accurate and real-time information of friendly, enemy, neutral, and noncombatant locations; a common, relevant picture of the battlefield scaled to specific level of interest and special needs.

Social psychology looks into all facets of human social interaction. Among the problems studied by social psychologists are such matters as the development of friendship, the nature of romantic attachment, and the relative effectiveness of cooperation and competition on achievement. In recent years social psychology has included the study of

attribution. Attribution theory recognizes that psychological perceptions of events do not always correspond to objective realities.

Well-defined Problem: (from James F. Voss and Timothy A. Post, "On the Solving of Ill-Structured Problems." In *The Nature of Expertise*, eds. Michelene T.H Chi, Robert Glaser and Marshall Farr (Hillsdale, NJ: Lawrence Erlbaum Associates, 1988), 261-284.)

1. Goal, criterion for judging outcomes and states
2. Initial state, starting situation, and resources
3. Admissible operations, rules for application to transform states and resources
4. Constraints, on what must be done along the way, final states to be reached
5. Outcome, a final state or solution.

Annex B. Leadership in the Strike Force

The purpose of this annex is to explain in greater detail the definition of leadership. This is not a summary of the new FM22-100, but it does attempt to address certain omissions from the doctrine. Specifically, the same style of leadership will not be effective in every situation, on every different day, or at all times. Effective leadership is not simply a laundry list of adjectives and adverbs. Whenever you are discussing the dynamics between two or more human beings, the result is complex and detailed.

Any definition of an abstract construct such as leadership, imposes limitations or restrictions on the concept. Understanding this, leadership is interpersonal influence exercised in a situation to direct at least one other person toward the attainment of a goal. There are also two critical unstated areas within this definition, power and individual motivation.

When defining a concept it is equally important to ensure that each element is comprehensible to the reader. The first element within the definition is interpersonal influence. Influence is a complex exchange in which one human being affects another. Interpersonal influence includes affecting an individual's attitudes, beliefs, perceptions, behaviors.

One could group the verb "exercised" and the infinitive "to direct" under the broader, unstated concept of power. Effective communication skills are also important qualities within the context of an individual's ability to direct or exercise. But the acquisition and application of power is central to my understanding of how influence happens. Power generally refers to the agent's ability to influence a person or an agent's potential influence over the attitudes and behavior of one or more designated target persons.

The next key word is situation. This is extremely relevant and appears absent from the current leadership doctrine. In this context a situation is the complex combination of the internal and external environment, the task, and the individuals. There are several concepts that are fundamental to an understanding of the situation. The world is not in a constant steady state, people and the environment change. The leader must be able to adapt to the dynamics of the situation or adapt the situation to him or herself in order to influence the "moving" target. But, to blanket all leader actions under the rubric of "adaptive leaders," is an over-simplification and an immediate distractor for the unformed reader. Finally, there are few events that may ever be viewed as in a vacuum, single actions often have multiple consequences for the leader and the led.

The fourth critical element is "at least one other person." It is important to an understanding that two human beings are interacting and must both be taken into consideration. The leader and the follower perceptions, motivations, needs, and personalities will all contribute to the dynamics of interpersonal influence.

The final aspect is that the influence is oriented toward the attainment of a goal. Within the context of the military, the goal is usually stated as success in combat or battlefield situations. The goal does not always have to be a tangible positive outcome, but the relevant concept is that the goal provides a desired endstate or purpose.

One could define motivation as the sum of all internal and external forces that energize behavior, provide direction to that behavior, and determine the persistence of the

behavior. Motivation is the why an individual acts or fails to act. It is also important to remember that the behavior of the leader, as well as the follower, is subject to individual motivation. Needs theories best explain the primary internal motivation of individuals. The basic assumption of the needs theories human needs are the main driving force behind behavior. Primary focus is on the interrelationships between these internal needs, environmental stimuli, and subsequent behavior.

The key concept within the needs theories is that an unsatisfied need creates an internal state of disequilibrium which is uncomfortable for the individual. In order to restore the equilibrium, people are energized to reduce the need. This approach assumes that human beings constantly seek a state of internal homeostasis.

McClelland and Atkinson believed that needs could be learned rather than primarily innate as in Maslow's Needs Hierarchy and Alderfer's ERG theories. According to this theory people grow and develop they learn from their social environment that competence is admired by people important to them. Accordingly, the desire to be seen as competent becomes strong in people a learned need.

McClelland's needs for achievement, affiliation, and power are important concepts in my understanding of what motivates individuals and why some leaders perform better than others. Need theories provide a key that allows a leader to structure the work environment in order to provide the link between individual needs and organizational goals.

Equity involves the inputs a person brings to the work environment and outcomes the person receives as a result of those inputs. It primarily involves the perceptions of the individual. The catch phrase that "perception is reality" is the basic assumption of this theory.

Expectancy theory may also explain why something does not happen as intended. The most salient point is the leader must understand his or her subordinates, what their capabilities are and what is important to them. The central belief of expectancy theory is that a strength of tendency to act in certain way depends on the strength of an expectancy that this act will be followed by a given or a particular outcome, and on the value or attractiveness of the outcome.

The acquisition and application of power is the central underlying assumption of my definition of interpersonal influence. Power as the effect of one party (agent) on another (target).

Internalization is achieving a personal commitment to ideals, concepts, and goals not for the leader, but rather because they accept it as the right thing to do.

A general concept of power is the combination of position, personal, and political sources. Position power is based on formal authority and the leader's control of resources, rewards, information, punishments, and the environment. Personal power is based on expertise, friendship, loyalty, and charisma. Political power is based on the leader's control over decision processes, coalitions, and the ability to co-opt others internal and external to the organization.

A leader must also understand that power is exercised in different forms and with varying results. Coercive power will most likely result in the target complying in order to avoid punishments controlled by the agent. With coercive power, compliance and resistance are the likely outcomes.

A leader can try to exercise power in a variety of manners and from a mixture of bases, but the effectiveness will depend on whether the leader actually possesses the power.

There are other power bases from which a leader may operate and may result in different target responses. Through reward power the target complies in order to obtain rewards they believe are controlled by the agent, in which compliance is the likely result. From a legitimate power base the leader may expect the target to comply because he or she believes the agent has the right to make the request and the target person is obliged to comply.

Through the application of expert power the agent may get the target to comply because they believe the agent has special knowledge about the best way to do something. This may achieve internalization or identification. Finally, from a base of referent power the target complies because they admire or identify with the agent and want to gain their approval. Again, the agent may gain internalization and identification from the target.

Internalization is by far the most difficult level for agent to achieve within a target. This extended discussion of power is necessary because without some form of power, the individual is not the leader and is unable to exercise any influence over others. I also think it is important to my theory to understand how power is gained and lost. There are a few theories that provide an explanation. The social exchange theory proposes that an exchange process is established and maintained if the benefits of both the leader and the followers outweigh the cost.

There are three other theories that aid in my understanding of how power develops between individuals. Negotiated order establishes the concept that an exchange exists between the leader and the led for power and position. The transactional approach focuses on the relationship of the leader to the led, just like in organizations the followers had impact on the leaders. The important concept is a two way influence exists. A transaction exchange is characterized by mutual trust and the perception of fairness of social, material, and psychological benefits.

The last theory that helps me explain how power is gained, maintained, or lost is the idiosyncratic credit (IC) theory. The approach postulates that a group member who has accumulated a large positive balance of credits through contribution of one type of another will be highly valued by others, have high status, and generally free to vary from the group norm to a much greater extent than will a low credit member. In addition to explaining why individuals with the same level of position power may rise over others, this is the basis of how informal leaders develop in groups within regular army units. Overall, IC helps in understanding leadership as a dynamic process, and explains the power for first impressions and supplements the other transactional and exchange theories.

The Army structures a great deal of their institutional theory of interpersonal influence around motivation through consequences, specifically reinforcement theory. Reinforcement is the application of an external motivational force that increases the likelihood that a desired behavior will continue or recur. Punishment and extinction (withholding recognition) decrease the likelihood that undesirable performance will recur.

Positive reinforcement (awards, recognition) is a stimulus which, when added to the situation, strengthens the probability of the response recurring.

Avoidance learning is designed to produce behavior that will seek to avoid noxious or painful stimuli. Extinction is used to reduce undesirable behaviors through withholding rewards short of actual punishment in order to stop a behavior. Punishment is presenting an aversive or noxious consequence contingent upon a response, or removing a positive consequence contingent upon a response. Rewards are designed to strengthen behavior while punishment is designed to weaken it.

There are a few elements within the job redesign and enrichment theory of Hackman that are important to my understanding of how to motivate the target. There are three core job dimensions determine the individual's motivation to accomplish the mission in this theory; skill variety, task identity, and task significance. Increasing skill variety is adding to the degree to which a job requires a variety of different activities that involve the use of a greater number of different skills and talents. Soldiers must have task identity, in that the job must be seen as a meaningful work. Also, the task must be significant, in that the person sees the task or job as having importance for the organization as a whole.

This understanding from Hackman leads one to a larger concept of situational leadership. The basic proposition of situational leadership is that different individuals perform better or worse than others in certain environmental conditions. The important assumption is that the leader's behavior will have an influence on the targets. Path-goal and situational leadership theories focus on the follower perceptions, abilities, maturity, and motivation, while the contingency model includes both the leader and the follower in the motivation equation.

It is important to realize that Fiedler focuses on the leader's personality and motivation. The assumption is that the leader would like to obtain certain things from the leadership situation, not just for the organization in the role as the organizational leader, but also as an individual who happens to be in the role of a leader. In the hierarchy of the military there are many leaders and it is important to remember they will each have their own individual motivation for action or inaction.

The situational components of the model deal with the interaction of the leader and members, characteristics of the task to be performed, and organizational power possessed as a result of the leadership position. The model attempts to integrate leader attributes, leader behavior, and situational variables, in a very complex, contingency relationship where effectiveness depends upon leader style and certain aspects of the situation.

The Contingency Model offers a remedial plan for increasing leader effectiveness different from all other leadership theories. There may be a singular path to increase effectiveness, the one best way. But for others, such as for Vroom, the way to increase effectiveness would depend on the variable interaction between conscious choices and problem situation. But Fiedler sees an entirely different course of action. Because a leader's Least Preferred Co-Worker (LPC) is what matters, and LPC is relatively unchanging, then either one must identify and select leaders of high or low LPC to fit given situations or leaders need to know their LPC scores and in what situations they are most effective in order to change the situation rather than themselves. Fiedler argues that

changing leader-member relations or task structure or a leader's position power is easier than changing a leader's personality.

In Fiedler's Contingency Model, a leader's effectiveness depends on the LPC scores and on whether the situation is favorable. The basic assumption is that the LPC is a stable personality attribute, it follows that leadership effectiveness can best be increased by teaching leaders how to make situations more favorable to themselves. The Leader Match is an attempt to address the consequences of training for group performance and member satisfaction. The Leader Match teaches leaders how to (1) assess their own leadership style based on their LPC scores; (2) assess the amount of situational favorability; and (3) change the situation so that it matches their style.

Charismatic and transformational leadership theories could be included within the concept of how power is acquired and how a different leadership styles are more effective in different situations. There are several additional concepts that are addressed within this monograph's definition, but not explicitly mentioned.

Hedonism is an underlying concept within most of the needs theories and is represented therein. MacGregor's theory "X" and theory "Y" approach is also an underlying assumption of many theories of interpersonal influence. The Ohio State and University of Michigan studies make similar conclusions as Fiedler and the situational theories.

Interpersonal influence is a complex exchange between human beings and may be measured through the accomplishment of the goal and leader and follower satisfaction. Effectiveness as a leader is probably best measured not by not what you do on the top, but how far you bounce back when you are on the bottom. I would focus the willingness of the target to adopt the organizational goal as their own in the face of adversity.

Annex C. Cognitive and Temperament Predictors of Executive Ability: Principles for Developing Leadership Capacity. Proposed Leadership KSAPs (knowledge, skills, attributes, and personality constructs).

Cognitive Generating Factors

General Cognitive Intelligence

Problem Anticipation
Inductive Reasoning
Deductive Reasoning
Time Sharing

Creativity

Definition of a Problem
Fluency
Originality

Crystallized Cognitive Skills

Oral Comprehension
Written Comprehension
Information Ordering
Selective Attention
Technical Ability
Personality

Adaptability/Ego Resiliency

Performance Motivation
Adaptability
Emotional Control
Energy Level
Risk Taking
Self-esteem
Sensing

Openness/Curiosity

Cognitive Complexity
Openness to Experience
Investigative
Tolerance for Ambiguity
Intuition
Thinking
Perceiving

Self-awareness

Internal Locus of Control
Tolerance for failure
Self-appraisal
Discretion (ego control)
Values and Motives

Achievement

Achievement
Autonomy
Self-Expression
Mastery Motives

Need for Dominance

Enterprising
Political
Need for Power
Judgment

Commitment to Social Systems

Responsibility
Social
Social Alienation (-)
Object Belief (-)
Coaching

Embedded appraisal and implementation skills

Practical intelligence
Monitoring Goal-Relevant Cues
Selection of Solution
 Components
Information Appraisal
Prioritizing
Information Gathering and
 Encoding
Planning and Implementation
Implementation of a Solution
Evaluation of Discrepancy
 Importance
Monitoring

Implementation and Solution

Outcomes

- Problem Sensitivity
- Administrative Skills
- Social Intelligence
- Negotiation Skills
- Interpersonal Sensitivity
- Social Confidence
- Empathy
- Social Adroitness
- Norm Sensitivity
 - (Social Conformity)
- Adherence to Procedures
- Feeling
- Wisdom

Annex D. The Leadership Framework of VALUES, ATTRIBUTES, SKILLS, and ACTIONS from FM 22-100 is the foundation for all leadership and leader development action.

LEADER VALUES. Values are at the core of everything the Army is and does. The Army is an institution of people with unique and enduring values. These values must be a part of the men and women- officers, enlisted personnel, and civilians- who are the Army. There are currently seven Army values.

- (1) Loyalty. Bear true faith and allegiance to the U.S. Constitution, the Army, your unit, and other soldiers.
- (2) Duty. Fulfill your obligations.
- (3) Respect. Treat people as they should be treated.
- (4) Selfless-service. Put the welfare of the nation, the Army, and your subordinates before your own.
- (5) Honor. Live up to all the Army values.
- (6) Integrity. Do what's right, legally and morally.
- (7) Personal Courage. Face fear, danger, or adversity (Physical or Moral)

These values provide the sense of purpose necessary to sustain our soldiers in combat and help resolve ambiguities in operations other than war. Leaders must establish and maintain an environment in the Army where soldiers and civilians do what is right; where we treat each other as they should be treated; and, where everyone can be all they can be. These values remain enduring.

However, in the Strike Force environment these organizational values are necessary, but not sufficient. The values of CANDOR and COMMITMENT are particularly relevant for the Strike Force organization. The ability to "call it like it is" is fundamental in an organization using reachback capabilities and operating in dispersed nodes. Additionally, leaders must be committed to the organization. The Strike Force operates as rapidly deployable unit and faces an unpredictable environment. Leaders must be prepared for multiple contingencies and this entails a special level of commitment by Strike Force leaders.

LEADER ATTRIBUTES. Attributes are fundamental qualities and characteristics. Attributes assist in defining what an leader should be and contribute to leader actions. Army leader attributes are described in three categories - mental, physical, and emotional. For the STRIKE FORCE environment, we have identified the following requisite attributes:

MENTAL

Internal Drive—Personal and Team Improvement
Cognitive flexibility

Accelerated learning/self-development

Intellectual curiosity (immersed in their craft)

Willingness/drive to learn – continuous assessment of self/organization

Systems thinker – understand/predict 2nd and 3rd order effects

Cultural Awareness

PHYSICAL

Physically hardened

Mature

EMOTIONAL

Actively involved, but not a micro-manager

Willing to delegate

Emotional Intelligence

Capable of operating with ambiguity (flexible-innovative-decisive)

Ego-less (know when to seek guidance/help)

Autonomous/self-motivating/self-awareness

Self-control

Able to cope with emotional stress

LEADER SKILLS. As we engage the future, leader skills provide a means to focus our efforts. Skills are generally synonymous with competencies. The emerging leadership doctrine identifies four categories of skills: interpersonal, conceptual, technical, and tactical skills. Interpersonal skill is competence in communicating with people, conceptual skill is competence with handling ideas, and technical skill is competence with things. Tactical is the ability to make the right decision concerning employment and maneuver of forces on the battlefield. Tactical skill includes mastery of the art of tactics appropriate to the leader's level of responsibility and unit type. It is amplified by the other skills—interpersonal, conceptual, and technical—and is the most important skill for warfighters. For a leader to do his job competently, he must use a combination of interpersonal, conceptual, and technical skills.

CONCEPTUAL

Mental agility

Plan and execute simultaneously

Communication of intent/visualization

Critical reasoning

Tacit knowledge of function, info requirements, performance parameters

Ability to recognize need for change/take action

Creative/adaptive thinking

Can recognize when mission/situation is changing

See obvious/not obvious ways to solve problems

Understand competing/opposing perspectives

Metacognition* (AARs the *process* of thinking/decision making)

Filtering Info—pattern analysis of complex situations

Systems Understanding

Understand interrelationships and implications of actions

Know how each part contributes to mission accomplishment.

Manage open system/deal with processes

INTERPERSONAL

Understanding Soldiers—rapid team building

- Teach/coach/mentor
- Conflict management
- Build/perpetuate trust
- Very comfortable with delegation & empowerment
- Assessment skills (self/individual/team)
- Negotiating*/Consensus Building*
- Political Sensitivity*
- Conflict management
- Superior/subordinate professional relationship
- Mentoring (give and receive)
- Persuasive/ability to create organizational change
- Communication skills (integrate team members, negotiation, appropriate focus/level of detail)
- Self-awareness
- Cultural awareness/diversity (open to other ideas)
- Communicating—nonverbal
 - Joint language skill
 - Understanding and dealing with cultural differences

TECHNICAL

- Systems literacy/proficiency (capabilities and limitations)
- Simultaneous planning and executing expertise
- Rapid and decentralized decision makers
- Multi-functional roles – true combined arms leader
- Broader basic skill sets
- Leveraging Technology*
 - Exploit reach-back capability
 - Current Technology
 - Know Joint/Combined/Enemy Capabilities/limitations
- Computer/Internet
- Communication Architecture

TACTICAL

- Task prioritization/management
 - Expert tactician – professional competence*
- Equally proficient in all mission types (offensive, defensive, stability and support)
- Increased proficiency in systems employment (creative and innovative)
- Transcultural operational understanding (joint, coalition, interagency, International Organizations, PVO)
- Prioritization of tasks and resources
- Exploit reach-back capability
- Calculated risk taking
- Highly proficient in specialty
- Competent in multiple dimensions
- Battlefield Visualization
- Tactical Level of War (Joint/combined)
- Tactical patience and restraint

Annex E. Assessment Mechanisms.

The following paragraphs highlight some of the measurement devices available to assess how an individual thinks. The current body of military research has focused primarily on the results of the leader's decision, rather than the thought process used to arrive at that decision. There are a few researchers working the issue for the Army, but at this time the question is does the Army really want to know the answer to someone else's test?

The **Test of Logic and Rhetoric** is primarily an essay-based assessment. There are five different essays on various topics graded on spelling, grammar, organization, quality of arguments, and quality of counter-arguments. The scientific clinical problem solving presents variables, hypotheses, conclusions, and relationships between variables, in which the student is asked to draw conclusions or relate data. There are other tests of science reasoning and understanding designed to measure critical thinking in science.

The **American Council on Education's Test of Critical Thinking Ability** (ACE) consists of 52 verbal, situational type items designed to test the same five areas: ability to define a problem, select information pertinent to the problem, recognize assumptions, formulate relevant hypotheses, and draw valid conclusions. The **Watson-Glaser Critical Thinking Appraisal** is a scale based on inference, recognition, and deduction. The **Test of Thematic Analysis** is an essay based test that assesses the "ability to form and articulate complex concepts in drawing contrasts among examples and instances in the real world." The test consists of two different groups of stories, essay describes the differences between them. The test is judged on parallel comparison, exceptions or qualifications, examples, overarching issues, redefinition, subsuming alternatives, nonparallel comparisons (apples/oranges), affective reactions, and subjective reactions.

The **Analysis of Argument Test (AOA)** that seeks to look at the quality of sound reasoning and critical thinking about issues with no verifiable solution. The AOA looks at more than one side and asks the recipient to argue both sides to see if he or she can look at the issue from more than one perspective. The **Reflective Judgment Interview (RJI)** as discussed earlier is based on the Perry scheme, and is widely used to test sound reasoning and the use of evidence to support conclusions. Reflective Judgment is defined as a form of justification based on the principle that knowledge and statements must be evaluated as more or less likely to the truth and that they must be open to the scrutiny and criticisms of other rational people.

Kitchner and King offer a model of "Reflective Judgment" defining a hierarchical, seven stage sequence of increasingly complex stages relating to what people know or believe and how they justify their knowledge claims and beliefs. Given the direction of their research, one could use the RJI in assessing the entry level Strike Force leader. Within the context of Reflective Judgment, college students (19-20 years) tended to assume that absolute knowledge was for practical reasons to attain, and they tended to view the justification process as idiosyncratic. Graduate students (24-34 years) tended to assume that knowledge claims needed to be and could be rationally justified as reasonable conjectures about reality.

This study is important in understanding how one progresses to the ability of being a mature inquirer, if that is a major goal of higher education. It also has important

implications for a person's ability to be a thinking member of society, and to successfully make judgments about complex problems. The bottom line of the RJI is to assess an individual's ability to critically reason means to examine different points of view, reflect on their logic, evaluate the evidence, and come to a conclusion about what seems most reasonable or likely.

Another significant effort in expanding the Perry scheme is the **Measure of Intellectual Development (MID)**. The MID is an essay based test consisting of three short essays scored according to how one construes the nature and origin of knowledge and responsibility in decision making. The MID was developed as an alternative to the costly and time consuming interview methodology of Perry. It is structured around a single open-ended question in essay form that probes a variety of content areas such as course work, decision-making, and career choice.

Additionally, the **Measure of Epistemological Reflection (MER)** is a test for postformal reasoning based on the first five stages of the Perry scheme. The MER is a written instrument that assesses the respondent's views in six domains of thinking related to learning and elicits specific justification for the respondents' thinking. The **Paragraph Completion Method (PCM)** is used to test the ability of an individual to deal with complexity by creating systems of thought and synthesizing large amounts of complex information. The PCM is a semiprojective measure designed to test conceptual level by having subjects complete sentence stems.

The social aspects of individual development are perhaps the most complex. The social aspect of development would include moral, ethical, personality, and career development. The moral and ethical measurement tools include the Perry scheme, Kitchner and King's Reflective Judgment Inventory, the **Moral Judgment Interview (MJ)**, and the **Defining Issues Test (DIT)**. Given the complexities of the environment and the missions, along with the demands on the Strike Force leader's character, these tests would be appropriate at any time in the assessment life cycle.

The personality area of development is measured through a myriad of projective and objective tests. The annex will not go into the details of each one, nor will this list be all inclusive. The following is a list of self-disclosure, objective personality tests: the Minnesota Multiphasic Personality Inventory-2 (MMPI-2); California Psychological Inventory (CPI); Sixteen Personality Factor Questionnaire (16 PF); Edwards Personal Preference Schedule; Personality Research Form; Adjustment Inventory (AI); California Test of Personality; Comrey Personality Scales; Edwards Personality Inventory; Eysenck Personality Inventory; Guilford-Zimmerman Temperament Survey; IPAT Anxiety Scale Questionnaire; Interpersonal Check List (ICL); Jackson Personality Inventory; Millon Clinical Multiaxial Inventory; and the Mooney Problem Check List. The Myers-Briggs Type Indicator reports degrees of preferences on four scales, and is widely used in personality assessment, but not generally in the psychological assessment process.

Projective tests take more time to administer and are not easily scored. Projective tests must be scored by schooled professionals and are less susceptible to client faking, hiding, or lying. The following projective tests are the most commonly used in the psychological assessment process: Rorschach Inkblot Test, the Thematic Apperception Test (TAT), and the Incomplete Sentences Blank (ISB).

SELECTED BIBLIOGRAPHY

BOOKS

- Ackoff, Russell L. *The Art of Problem Solving*. New York: John Wiley and Sons, 1978.
- Adair, John. *Training for Decisions*. London: MacDonald and Company, 1971.
- Albrecht, Karl. *Brain Power: Learn to Improve Your Thinking Skills*. Englewood Cliffs, New Jersey: Prentice Hall, Incorporated, 1980.
- Argyris, Chris. *Overcoming Organizational Defenses: Facilitating Organizational Learning*. Needham Heights, Massachusetts: Allyn and Bacon, 1990.
- Aristotle. *Nicomachean Ethics*. J.A.K. Thompson, trans. New York: Penguin Books, 1976.
- Associates, The Department of Behavioral Sciences and Leadership. *Leadership in Organizations, Third Edition*. West Point, NY: United States Military Academy, 1985.
- Bandura, Albert. *Social Learning Theory*. Englewood Cliffs, NJ: Prentice-Hall, Incorporated, 1977.
- Beckhard, Richard and Reuben T. Harris. *Organizational Transitions: Managing Complex Change, Second Edition*. Reading, Massachusetts: Addison-Wesley Publishing Company, 1987.
- Beniger, James R. *The Control Revolution*. Cambridge, MA: The Harvard University Press, 1986.
- Bertalanffy, Ludwig von. *General System Theory: Foundations, Development, Applications. Revised Edition*. New York: George Braziller, 1968.
- Bloom, Benjamin S., ed. *Taxonomy of Educational Objectives, Book 1 Cognitive Domain*. New York: Longman, 1956.
- Bloom, Benjamin S., David R. Krathwohl, Bretram B. Masia. *Taxonomy of Educational Objectives, Book 2 Affective Domain*. New York: Longman, 1964.
- Brown, Frederick J. *The U.S. Army in Transition II: Landpower in the Information Age*. Washington, D.C.: Brassey's Incorporated, 1993.
- Chi, Michelene T.H., Robert Glaser and Marshall Farr, eds. *The Nature of Expertise*. Hillsdale, NJ: Lawrence Erlbaum Associates, 1988.

- Chickering, Arthur W. *Education and Identity*. San Francisco, CA: Jossey Bass, 1990.
- Clausewitz, Carl von. *On War*, trans. and ed. Michael Howard and Peter Paret. Princeton, New Jersey: Princeton University Press, 1984.
- Cohen, Marvin S. "When the Worst Case is Best: Mental Models, Uncertainty and Decision Aids." In *Science of Command and Control: Coping with Uncertainty*, eds. Stuart E. Johnson and Alexander H. Levis. Washington, D.C.: National Defense University, AFCES International Press, 1988.
- Collins, Arthur Jr., *Common Sense Training "A Working Philosophy for Leaders,"* Presido Press, 1978.
- Compton's Interactive Encyclopedia*, Cambridge, MA: The Learning Company, 1998.
- Corbin, Ruth M. "Decisions That Might Not Get Made." In *Cognitive Processes in Choice and Decision Behavior*, ed. Thomas S. Wallensten. Hillsdale, NJ: Lawrence Erlbaum Associates, 1980.
- Corsini, Raymond J. and Danny Wedding. *Current Psychotherapies, Fourth Edition*. Itasca, IL: F.E. Peacock Publishers, 1989.
- Crain, William. *Theories of Development; Concepts and Applications*. Englewood Cliffs, NJ: Prentice Hall, 1992.
- Creveld, Martin van. *Command in War*, Cambridge, Massachusetts: Harvard University Press, 1985.
- _____. *The Training of Officers: From Military Professionalism to Irrelevance*. New York: The Free Press, Macmillan, Incorporated, 1990.
- Daft, Richard L. *Organizational Theory and Design, Fourth Edition*. St. Paul, Minnesota: West Publishing Company, 1992.
- deKleer, Johan and John Seely Brown. "Assumptions and Ambiguities in Mechanistic Mental Models." In *Mental Models*, eds. Dedre Gentner and Albert L. Stevens. Hillsdale, NJ: Lawrence Erlbaum Associates, 1983.
- diSessa, Andrea A. "Phenomenology and the Evolution of Intuition." In *Mental Models*, eds. Dedre Gentner and Albert L. Stevens. Hillsdale, NJ: Lawrence Erlbaum Associates, 1983.
- Dreyfus, Hubert L. and Stuart E. Dreyfus. *Mind Over Machine: The Power of Human*

- Intuition and Expertise in the Era of the Computer*. New York: Macmillian Incorporated, 1986.
- Einhorn, Hillel J. "Learning from Experience and Suboptimal Rules in Decision Making." In *Cognitive Processes in Choice and Decision Behavior*, ed. Thomas S. Wallensten. Hillsdale, NJ: Lawrence Erlbaum Associates, 1980.
- Fischhoff, Barauch, Paul Slovic, and Sarah Lichtenstein. "Knowing What You Want: Measuring Labile Values. In *Cognitive Processes in Choice and Decision Behavior*, ed. Thomas S. Wallensten. Hillsdale, NJ: Lawrence Erlbaum Associates, 1980.
- Fuller, J.F.C. *Generalship: Its Diseases and the Cure*. Harrisburg: Military Publishing Company, 1936.
- Galbraith, Michael W., ed. *Facilitating Adult Learning: A Transactional Approach*. Malabar, Florida: Kreiger Publishing Company, 1991.
- Gentner, Dedre and Donal Gentner. "Flowing Waters or Teeming Crowds: Mental Models of Electricity." In *Mental Models*, eds. Dedre Gentner and Albert L. Stevens. Hillsdale, NJ: Lawrence Erlbaum Associates, 1983.
- Gentner, Dedre and Albert L. Stevens, eds. *Mental Models*. Hillsdale, NJ: Lawrence Erlbaum Associates, 1983.
- Glaser, Robert and Michelene T.H. Chi. Overview to the Nature of Expertise. In *The Nature of Expertise*, eds. Michelene T.H. Chi, Robert Glaser and Marshall Farr. Hillsdale, NJ: Lawrence Erlbaum Associates, 1988.
- Gregory, Richard L., ed. *The Oxford Companion to the Mind*, Oxford University Press, New York, 1987.
- Griffith, Samuel B. *Sun Tzu: The Art of War*. New York: Oxford University Press, 1963.
- Guderian, Heinz. *Panzer Leader*. New York: Da Capo Press, 1996.
- Hart, B.H. Liddell. *Strategy, Second Revised Edition*. New York: Meridian Books, Penguin Group, 1991.
- Hartle, Anthony E. *Moral Issues in Military Decision Making*. Lawrence: University of Kansas Press, 1989.
- Hartle, Anthony E. and John Kekes, eds. *Dimensions of Ethical Thought*. New York: Peter Lang Publishing, 1990.
- Hirsch, E.D., Jr. *The Schools We Need and Why We Do Not Have Them*. New York:

Doubleday, 1996.

Johnson, Eric J. "Expertise and Decision under Uncertainty: Performance and Process." In *The Nature of Expertise*, eds. Michelene T.H Chi, Robert Glaser and Marshall Farr. Hillsdale, NJ: Lawrence Erlbaum Associates, 1988.

Johnson, Stuart E. and Alexander H. Levis, eds. *Science of Command and Control: Coping with Uncertainty*. Washington, D.C.: National Defense University, AFCES International Press, 1988.

_____. *Science of Command and Control: Coping with Complexity, Part II*. Washington, D.C.: National Defense University, AFCES International Press, 1989.

Kant, Immanuel. *Immanuel Kant's Critique of Pure Reason*. Norman Kemp Smith, trans. New York: St. Martin's Press, 1969.

Keegan, John. *The Mask of Command*. New York: Penguin Books, 1987.

Kindler, Herbert S. *Risk Taking: A Guide for Decision Makers*. Menlo Park, CA: Crisp Publications, 1990.

Klein Gary A. "Naturalistic Models of C3 Decision Making." In *Science of Command and Control: Coping with Uncertainty*, eds. Stuart E. Johnson and Alexander H. Levis. Washington, D.C.: National Defense University, AFCES International Press, 1988.

Lawrence, Jeanette A., "Expertise on the Bench: Modeling Magistrates' Judicial Decision Making." In *The Nature of Expertise*, eds. Michelene T.H Chi, Robert Glaser and Marshall Farr. Hillsdale, NJ: Lawrence Erlbaum Associates, 1988.

Lind, William S. *Maneuver Warfare Handbook*. Boulder, Colorado: Westview Press, 1985.

Lindeman, Eduard C. *The Meaning of Adult Education*. New York: Harvest House, 1989.

Lockhead, Gregory R. "Know, The Decide." In *Cognitive Processes in Choice and Decision Behavior*, ed. Thomas S. Wallensten. Hillsdale, NJ: Lawrence Erlbaum Associates, 1980.

Louvet, Anne-Claire, Jeff T. Casey and Alexander H. Levis. "Experimental Investigation of the Bounded Rationality Constraint." In *Science of Command and Control: Coping with Uncertainty*, eds. Stuart E. Johnson and Alexander H. Levis. Washington, D.C.: National Defense University, AFCES International Press, 1988.

- Luttwak, Edward N. *Strategy: The Logic of War and Peace*. Cambridge, Massachusetts: The Belknap Press of the Harvard University Press, 1987.
- Macgregor, Douglas A. *Breaking the Phalanx: A New Design for Landpower in the 21st Century*. Westport, Connecticut: Praeger, 1997.
- Marshall, S.L.A. *Men Against Fire: The Problem of Battle Command in Future War*. Gloucester, Massachusetts: Peter Smith, 1978.
- Marshall, S.L.A. *Sinai Victory: Command Decisions in History's Shortest War, Israel's Hundred-Hour Conquest of Egypt East of Suez, Autumn, 1956*. Nashville: The Battery Press, 1985.
- McKenzie, Leon, ed. *Adult Education and Worldview Construction*. Malabar, Florida: Kreiger Publishing Company, 1991.
- Norman, Donald A. "Some Observations on Mental Models." In *Mental Models*, eds. Dedre Gentner and Albert L. Stevens. Hillsdale, NJ: Lawrence Erlbaum Associates, 1983.
- Nye, Roger H. *The Challenge of Command*. Wayne, NJ: Avery Publishing Group, Incorporated, 1986.
- Ott, J. Steven. *The Organizational Culture Perspective*. Pacific Grove, California: Brooks/Cole Publishing Company, 1989.
- Pascarella, Ernest T. and Patrick T. Terenzini. *How College Affects Students: Findings and Insights from Twenty Years of Research*. Jossey Bass: San Francisco, California, 1991.
- Payne, John W. "Information Processing Theory: Some Concepts and Methods Applied to Decision Research." In *Cognitive Processes in Choice and Decision Behavior*, ed. Thomas S. Wallensten. Hillsdale, NJ: Lawrence Erlbaum Associates, 1980.
- Paul, Richard W. *Critical Thinking: How to Prepare Students for a Rapidly Changing World*. Santa Rosa, California: Foundation for Critical Thinking, 1995.
- Perdu, Didier M and Alexander H. Levis. "Evaluation of Expert Systems in Decision Making Organizations." In *Science of Command and Control: Coping with Complexity, Part II*, eds. Stuart E. Johnson and Alexander H. Levis. Washington, D.C.: National Defense University, AFCE International Press, 1989.
- Perry, William G. Jr. *Forms of Intellectual and Ethical Development In the College Years: A Scheme*. Fort Worth, Texas: Harcourt, Brace Jovanovich College Publishers, 1968.

- Phillips, BG T.R., ed. *Roots of Strategy, Volume 1*. Harrisburg, Pennsylvania: Stackpole Books, 1985.
- Piatelli-Palmarini, Massimo. *Inevitable Illusions: How Mistakes of Reason Rule Our Minds*. New York: John Wiley & Sons, 1994.
- Plato. *The Republic*. Desmond Lee, trans. New York: The Viking Penguin Press, 1979.
- Pojman, Louis P. *Ethics: Discovering Right and Wrong*. Belmont, California: Wadsworth Publishing Company, 1990.
- Posner, Michael I. "Introduction: What Is It to Be an Expert?" In *The Nature of Expertise*, eds. Michelene T.H Chi, Robert Glaser and Marshall Farr. Hillsdale, NJ: Lawrence Erlbaum Associates, 1988.
- Rachels, James. *The Elements of Moral Philosophy*. New York: Random House, 1986.
- Random House College Dictionary, Revised Edition*. ed. Jess Stein. New York: Random House, 1980.
- Rigg, Robert B. *Realistic Combat Training and How to Conduct It*. Harrisburg, Pennsylvania: The Military Service Publishing Company, March 1955.
- Roman, Gregory A. *The Maxwell Papers*. "The Command or Control Dilemma: When Technology and Organizational Orientation Collide, Paper Number 8." Maxwell Air Force Base, AL: Air War College, 1997.
- Schein, Edgar H. *Organizational Culture and Leadership, Second Edition*. San Francisco, California: Jossey-Bass, 1992.
- Schon, Donald A. *Educating The Reflective Practitioner*. San Francisco, California: Jossey-Bass, 1990.
- Scott, W. Richard. *Organizations: Rational, Natural, and Open Systems, Third Edition*. Englewood Cliffs, NJ: Prentice Hall, 1992.
- Senge, Peter M. *The Fifth Discipline: The Art & Practice of the Learning Organization*. New York: Doubleday, 1990.
- Shafritz, Jay M. and J. Steven Ott. *Classics of Organization Theory, Third Edition*. Pacific Grove, California: Brooks/Cole Publishing Company, 1992.
- Soloway, Elliot, Beth Adelson, and Kate Ehrlich. "Knowledge and Processes in The Comprehension of Computer Programs." In *The Nature of Expertise*, eds.

- Michelene T.H Chi, Robert Glaser and Marshall Farr. Hillsdale, NJ: Lawrence Erlbaum Associates, 1988.
- Stackpole Books. *Roots of Strategy, Volume 2*. Harrisburg: Stackpole Books, 1987.
- Steers, Richard M. and Lyman W. Porter. *Motivation and Work Behavior, Fifth Edition*. New York: McGraw Hill, Incorporated, 1991.
- Sternberg, R.J. *Successful Intelligence*. New York: Simon and Schuster, 1996.
- Straszewski, James J. "Skilled Memory and Expert Mental Calculation." In *The Nature of Expertise*, eds. Michelene T.H Chi, Robert Glaser and Marshall Farr. Hillsdale, NJ: Lawrence Erlbaum Associates, 1988.
- Summers, Harry G. *On Strategy: A Critical Analysis of the Vietnam War*. Novato, California: Presidio Press, 1982.
- Taylor, Robert L. and William E. Rosenbach, eds. *Military Leadership, In Pursuit of Excellence, Second Edition*. Boulder, Colorado: Westview Press, 1992.
- Tight, Malcom. *Key Concepts in Adult Education and Learning*. New York: Routledge, 1996.
- Uhr, Leonard. *Pattern Recognition, Learning, and Thought: Computer-Programmed Models of Higher Mental Processes*. Englewood Cliffs, NJ: Prentice Hall, 1973.
- Van Trees, Harry L. "C3 Systems Research: A Decade of Progress." In *Science of Command and Control: Coping with Complexity, Part II*, eds. Stuart E. Johnson and Alexander H. Levis. Washington, D.C.: National Defense University, AFCES International Press, 1989.
- Voss, James F. and Timothy A. Post. "On the Solving of Ill-Structured Problems." In *The Nature of Expertise*, eds. Michelene T.H Chi, Robert Glaser and Marshall Farr. Hillsdale, NJ: Lawrence Erlbaum Associates, 1988.
- Waldrop, M. Mitchell. *Complexity: The Emerging Science at the Edge of Order and Chaos*. New York: Touchstone, 1992.
- Wallensten, Thomas S. ed. *Cognitive Processes in Choice and Decision Behavior*. Hillsdale, NJ: Lawrence Erlbaum Associates, 1980.
- Weigley, Russell F. *The American Way of War*. Bloomington: Indiana University Press, 1973.
- Williams, Michael D., James D. Hollan, and Albert L. Stevens. "Human Reasoning About a Simple Physical System." In *Mental Models*, eds. Dedre Gentner and Albert L.

- Stevens. Hillsdale, NJ: Lawrence Erlbaum Associates, 1983.
- Williamson, Porter B. *Patton's Principles: A Handbook for Manager's Who Mean It!*. New York: Simon and Schuster, 1979.
- Wortman, Camille B, Elizabeth F. Loftus, and Mary Marshall. *Psychology*. New York: Alfred A. Knopf, 1981.
- Young, Richard M. "Surrogates and Mappings: Two Kinds of Conceptual Models for Interactive Devices." In *Mental Models*, eds. Dedre Gentner and Albert L. Stevens. Hillsdale, NJ: Lawrence Erlbaum Associates, 1983.
- Yukl, Gary A. *Leadership in Organizations, Second Edition*. Englewood Cliffs, NJ: Prentice Hall, 1989.

ARTICLES, MONOGRAPHS, AND THESES

- Agoglia, John F. "Operational Leader Development: Fostering the Institutionalization of Intellectual Innovation." Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, Fort Leavenworth, KS, 1994.
- Bartlett, David A. and Robert F. Curtis. "Why Not a Commandant's Wargame and Simulation List?" *Marine Corps Gazette*, 78(7), (July 1994): 28-30.
- DiSessa, Andrea A. "The Third Revolution in Computers and Education. Special Issue; Cognitive Consequences of Technology in Science Education." *Journal of Research in Science Teaching*, 24(4), (1987): 343-367.
- Downing, Wayne A. "Training to Fight." *Military Review*, 66(5), (May 1986): 18-27.
- Dymek, Chester F. "Intellectual Development." Masters Thesis, Long Island University and United States Military Academy, West Point, New York, 1994.
- Dymek, Chester F. "*Developing Situational Understanding: Will a Digitized Force See the 21st Century Forest Through the Trees?*" First Term Monograph, School of Advanced Military Studies, Fort Leavenworth, Kansas, 1999.
- Franks, Frederick M. "Battle Command: A Commander's Perspective." *Military Review*, 76(3), (1996): 4-25.
- Funk, LTG Paul E. "The Army's Digital Revolution." *Army Magazine*, 44(2), (February 1994): 33.
- Garrett, Stephen F. "Evolving Information-Age Battle Staffs." *Military Review*, 78(2), (March-April 1998): 28-36.

- Guenther, LTG Otto J. "Managing the Race for Information Dominance." *Army Magazine*, 47(6), (June 1997): 23-25.
- Johnson, Robert C. "Warrior Spirit: What it is and How to Make it Happen." Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, Fort Leavenworth, KS, 1994.
- Horvath, Joseph A. Yale University, George B. Forsythe, Patrick J. Sweeney, Jeffrey A. McNally, and John Wattendorf, US Military Academy. Wendy M. Williams and Robert J. Sternberg, Yale University, Technical Report 1018, *Tacit Knowledge in Military Leadership: Evidence from Officer Interviews*. United States Army Research Institute for the Behavioral and Social Sciences, October 1994.
- Keller, F. "Good-bye teacher." *Journal of Applied Behavior Analysis*, 1, (1968): 79-89.
- Kegan, Robert G. "The Evolving Self: A Process conception for Ego Psychology." *The Counseling Psychologist*, 8,(2), (1979): 5-34.
- Krulak, Charles C. "Embracing Innovation." *Marine Corps Gazette*, 80(1), (January 1996): 18-20.
- _____. "Thinking Anew." *Marine Corps Gazette*, 80(6), (June 1996): 14-15.
- Larsen, James C. "Initiative-Oriented Training." Masters Thesis, U.S. Army Command and General Staff College, Fort Leavenworth, KS, 1998.
- Leedom, Dennis K. and Jon Fallesen. "Initial Insights From Prairie Warrior 98: Cognitive Engineering of the Digital Battlefield." Fort Leavenworth, KS, Army Research Laboratory, 3 September 1998.
- Madigan, James C. "Self-Development and the Art of Battle Command." Masters Thesis, U.S. Army Command and General Staff College, Fort Leavenworth, KS, 1998.
- Martin, Peter J. "Leader Competencies: Implications for Force XXI. FY 95 Mobile Strike Force Battle Command Experiment." TRADOC Analysis Center, Fort Leavenworth, Kansas, June 1995.
- Michel, Rex. "Measuring Battlefield Knowledge Structures: Test of a Protocol Analysis Approach." US Army Research Institute for the Behavioral and Social Sciences, Fort Leavenworth, Kansas, June 1998.
- Mumford, Michael, Stephen J. Zaccaro, Francis Harding, Edwin A. Fleishman, and Roni Reiter-Palmon. Technical Report 977, "Cognitive and Temperament Predictors of Executive Ability: Principles for Developing Leadership Capacity." US Army Research Institute for the Behavioral Sciences, Management Research Institute,

May 1993.

Naylor Sean D., "Reimer defends Strike Force headquarters," *Army Times*, 18 January 18, 1999, 14.

Reimer, Dennis J., "The Annual Report on the Army After Next Project, July 1997," Department of the Army, Office of the Chief of Staff, (1 August 1997): 22-24.

Reimer, Dennis J., "The Army is People," *Army Magazine*, 48 (10), (October 1998): 17-26.

Rosenberger, John D. "Training Battle Command: Coaching the Art of Battle Command," *Military Review*, 76(3), (May-June 1996), 26-38.

Ross, Jimmy D. "Winning the Information War." *Army Magazine*, 44(2), (February 1994): 27-32.

Ross, Karol G. "Filling the Theoretical Gap in Battle Staff Training: A Constructivist Paradigm." U.S. Army Research Laboratory, Fort Sill, Oklahoma, 1999.

Ross, Karol G., Linda G. Pierce, COL Peter S. Corpac. "Revitalizing Battle Staff Training," a draft article for the Field Artillery Journal (US Army Research Laboratory, Fort Sill, Oklahoma, 1999).

Rumsey, Michael G. "21st Century Lieutenants" U.S. Army Research Institute, Fort Leavenworth, Kansas, 1999.

Scaife, M. "Education, Information Technology and Cognitive Science." *Journal of Computer Assisted Learning*, 5(2), (1989): 66-71.

Sherrill, Todd E. and Donald R. Barr. "Assessing Situational Awareness in Task Force XXI." A Technical Report of the Operations Research Center, United States Military Academy, West Point, New York. June 1997.

Simon, Herbert A. "Theories of Decision Making in Economics and Behavioral Science." *American Economic Review*, 49, (1959): 253-283.

Schneider, James J. "Black Lights: Chaos, Complexity and the Promise of Information Warfare." In *Foundations of Military Theory Course 1 Syllabus*, U.S. Department of the Army, Command and General Staff College, School of Advanced Military Studies. Fort Leavenworth, Kansas. 10 May 1998.

_____. "Cybershock: Cybernetic Paralysis as a New Form of Warfare." In *Foundations of Military Theory Course 1 Syllabus*, U.S. Department of the Army, Command and General Staff College, School of Advanced Military Studies. Fort Leavenworth, Kansas. 10 May 1998.

- Steele, Dennis. "Task Force XXI Advanced Warfighting Experiment at NTC." *Army Magazine*, 47(5), (1997): 14-23.
- _____. "AWE: Testing Soldiers and Equipment." *Army Magazine*, 47(6), (June 1997): 26-38.
- _____. "The Army XXI Heavy Division – First Blueprint of the Future Army." *Army Magazine*, 48(7), (July 1998): 33-35.
- Sullivan, Gordon. "A New Force For A New Century." *Army Magazine*, 44(5), (May 1994): 25-26.
- Sullivan, Gordon and Anthony M. Coroalles. "The Army in the Information Age, Part 1 of 2." Available on the SSI HomePage, US Army War College, Carlisle Barracks, <http://carlisle-www.army.mil/ns-search/usassi/ssipubs/pubs95/armyinfo/sull-1-1.htm>, (31 March 1995).
- Sullivan, Gordon and James M. Dubik. "Land Warfare in the 21st Century, Part III" Available on the SSI HomePage, US Army War College, Carlisle Barracks, <http://carlisle-www.army.mil/ns-search/usassi/ssipubs/pubs93e/landwar/landp3.htm>, (February 1993).
- _____. "War in the Information Age, Part II." Available on the SSI HomePage, US Army War College, Carlisle Barracks, <http://carlisle-www.army.mil/ns-search/usassi/ssipubs/pubs94/warinfo/infop2.htm>, (6 June 1994).
- Tilford, Earl. "The Revolution of Military Affairs: Prospects and Cautions." Available on the SSI HomePage, US Army War College, Carlisle Barracks, <http://carlisle-www.army.mil/ns-search/usassi/ssipubs/pubs95/rmaprop2.htm>, (23 June 1995).
- Vickers, Ross R. "Using Personality Assessment for Leadership Selection." Report Number 95-16, Naval Health Research Center, San Diego, California, 1995.
- Wass de Czege, Huba and Jacob Biever. Optimizing Future Battle Command Technologies. *Military Review*, 78(2), (March-April 1998): 15-21.
- Williams, Darryl A. "Beyond Be, Know, Do: Leadership Implications for the Force XXI Leader." Monograph, School of Advanced Military Studies, U.S. Army Command and General Staff College, Fort Leavenworth, KS, 1996.
- Wilson, Johnnie E. "The Information Age Army." *Army Magazine*, 47(6), (June 1997): 14-22.

U.S. GOVERNMENT AND MILITARY PUBLICATIONS

Joint Chiefs of Staff. OC Incorporated, software developers. "Joint Electronic Library, CD-ROM." Washington D.C.: U.S. Government Printing Office, 1998.

U.S. Department of the Army, Chief of Staff. "Knowledge and Speed: The Annual Report on the Army After Next Project." Washington D.C., July 1997.

U.S. Department of the Army, Command and General Staff College, Battle Command Battle Lab. Pamphlet, 2-1, *Focused Rotation Findings*. Fort Leavenworth, Kansas, 1996.

U.S. Department of the Army, Command and General Staff College. Student Text 101-5, *Command and Staff Decision Processes*. Fort Leavenworth, Kansas, 20 February 1996.

U.S. Department of the Army, Command and General Staff College, School of Advanced Military Studies. *Foundations of Military Theory Course 1 Syllabus*. Fort Leavenworth, Kansas, 10 May 1998.

U.S. Department of the Army, Headquarters. Army Regulation 600-100, *Army Leadership*, Washington, D.C., 17 September 1993.

_____. Department of the Army Regulation 351-1, *Individual Military Education and Training*. Washington, D.C., 15 October 1987.

_____. Department of the Army Pamphlet 350-58, *Leader Development for America's Army: The Enduring Legacy*. Washington, D.C., 17 September 1993.

_____. Department of the Army Pamphlet 600-3, *Commissioned Officer Professional Development and Utilization*, Washington, D.C., 30 September 1986.

_____. Field Manual 100-1, *The Army*. Washington, D.C., 14 June 1994.

_____. Field Manual 100-5, *Operations*. Washington, D.C., 14 June 1993.

_____. Field Manual 100-5, (DRAFT), *Operations*. Fort Leavenworth, Kansas, June 1998.

_____. Field Manual 100-22, *Military Leadership*. Washington, D.C., 31 July 1990.

_____. Field Manual 100-22, (DRAFT), *Army Leadership*. Fort Leavenworth, Kansas, January 1999.

_____. Field Manual 101-5, *Staff Organizations and Operations*. Washington, D.C., June 1997.

U.S. Department of the Army, Headquarters, Training and Doctrine Command.
TRADOC Pamphlet 525-5, *Force XXI Operations – A Concept for the Evolution of Full-Dimensional Operations*. Fort Monroe, Virginia, 1 August 1994.

_____. TRADOC Pamphlet 525-66, *Future Operational Capability*. Fort Monroe, Virginia, 1 May 1997.

_____. TRADOC Pamphlet 525-70, *Battlefield Visualization Concept*. Fort Monroe, Virginia, 1 October 1995.

U.S. Department of the Army, Training and Doctrine Command, Center For Army Lessons Learned. *Advanced Warfighting Experiment, NTC Rotation 97-06*. Fort Leavenworth, Kansas, March 1997.

_____. *Division XXI Advanced Warfighting Experiment (DAWE), Initial Insights Report (IIR)*. Fort Leavenworth, Kansas, 21 January 1998.

U.S. Department of Defense, Office of the Assistant Secretary of the Army (Research, Development, and Acquisition). *Weapons Systems 1998*. Washington, D.C., U.S. Government Printing Office, 1998.